

MISTLE DOG TIMBER SALE PROJECT



Checklist Environmental Assessment
JUNE 2013

Montana Department of Natural Resources and Conservation
Northwestern Land Office — Stillwater Unit

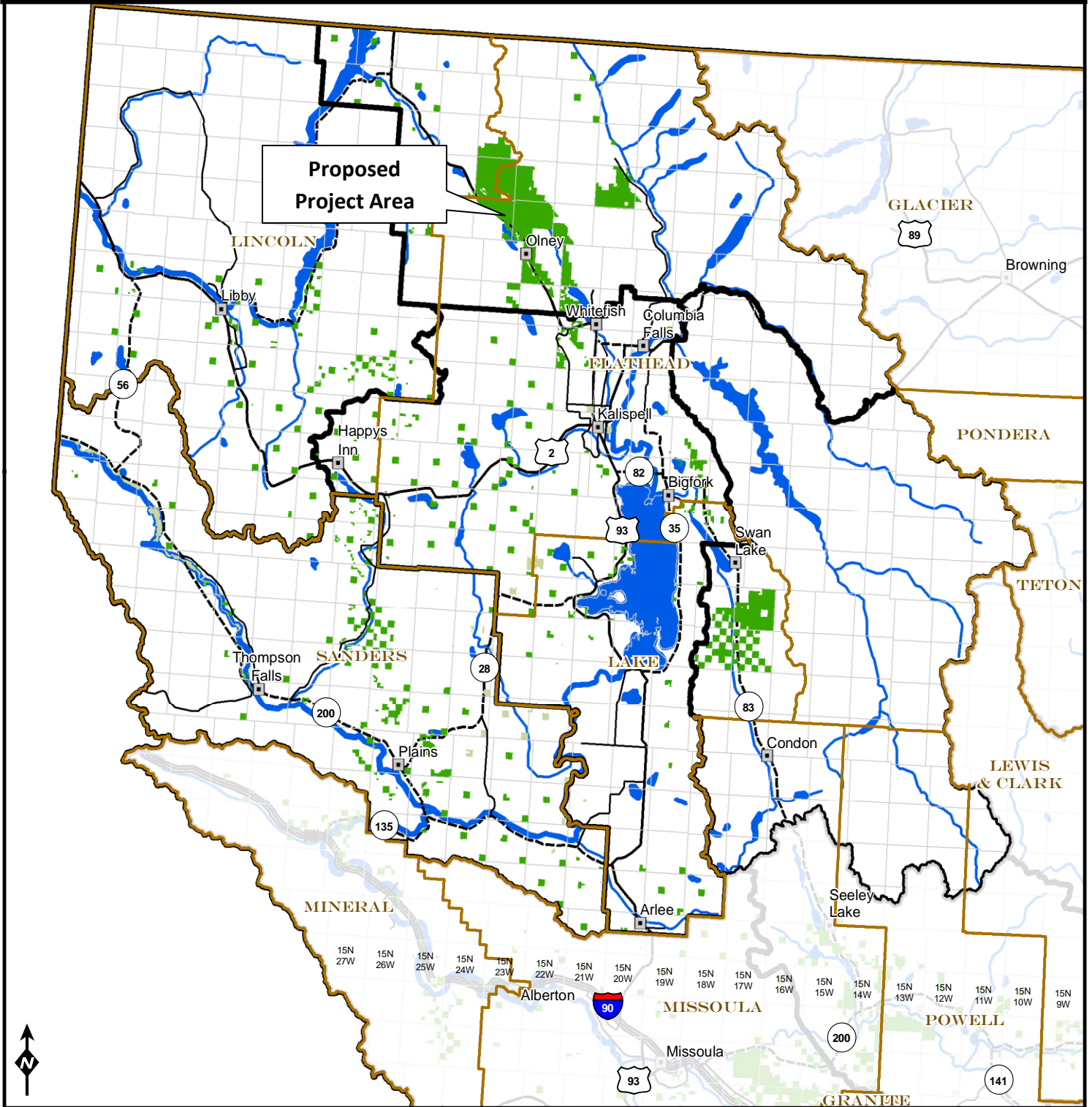


Mistle Dog Timber Sale Vicinity Map

Sections 19 & 20, T33N R23W

Flathead County

DNRC – Stillwater Unit, Olney, Montana



	Interstate Highway		County		City
	U.S. Route		DNRC other		Township/Range
	State Highway		DNRC managed for timber		Management Unit
	Secondary Roads				

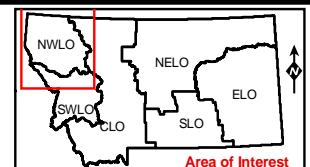


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CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Mistle Dog Timber Sale
Proposed Implementation Date:	Summer 2013
Proponent:	Montana Department of Natural Resources and Conservation (DNRC), Northwestern Land Office, Stillwater Unit
Location:	Sections 19 and 20, Township 33 North, Range 23 West
County:	Flathead

I. TYPE AND PURPOSE OF ACTION

Montana Department of Natural Resources and Conservation (DNRC), Stillwater Unit, proposes to harvest approximately 500,000 board feet of timber from the Stillwater State Forest near Olney, MT (see Attachment I -- Project Map). The proposed project would regenerate new stands of healthy trees while improving the vigor and growth of the remaining trees in the forest for the purpose of benefiting future timber stand development. Furthermore, the proposed project would reduce the amount of forest fuels present while lowering the density of trees to mitigate the potential effects of wildland fire. Only minor road maintenance is required, and the acquisition of an SMZ Law Alternative Practice will allow DNRC to cross an associated wetland during timber harvesting and subsequent site prep activities. This project would produce an estimated \$137,464.00 in revenue for the Common Schools (CS) Trust.

The lands in this project area are held in trust by the State of Montana for the support of specific beneficiary institutions (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners (Land Board) and DNRC are legally required to administer these trust lands to produce the largest measure of reasonable and legitimate long-term return for the trust beneficiaries (Montana Code Annotated 77-1-202).

This project was developed in compliance with the State Forest Land Management Plan (SFLMP), the Administrative Rules for Forest Management (Forest Management Rules; ARM 36.11.401 through 471), and the Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP), as well as other applicable State and federal laws.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

In September 2012, DNRC solicited public participation on the Mistle Dog Timber Sale Project. Scoping notices were advertised in the Daily InterLake (Kalispell) and Whitefish Pilot (Whitefish) newspapers, and posted at the Olney Post Office. The Initial Proposal with maps was sent to neighboring landowners, individuals, agencies, industry representatives, and other organizations that have expressed interest in DNRC's management activities. The mailing list of parties receiving the Initial Proposal, and the comments received, are located in the project file at the Stillwater Unit Headquarters. The public comment period for the Initial Proposal was open for 30 days. DNRC received one letter in response.

In September 2012, the Interdisciplinary (ID) Team began to gather information related to the current conditions of the project area. Hydrological, soils, wildlife, vegetative, and visual concerns were identified by DNRC resource specialists and field foresters for the No-Action and Action Alternatives. The ID Team determined that the issues directly related to the proposed actions could be addressed through project design and/or mitigation measures.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.

Montana Department of Environmental Quality (DEQ)

The DNRC, classified as a major open-burner by the DEQ, is issued a permit from the DEQ to conduct burning activities on State lands managed by the DNRC. As a major open-burning permit holder, the DNRC agrees to operate within the confines of the permit at all times.

Montana/Idaho Airshed Group

The DNRC is a member of the Montana/Idaho Airshed Group which regulates prescribed burning, including both slash and broadcast burning, resulting from forest-management activities performed by the DNRC. As a member of the Airshed Group, the DNRC agrees to only burn on days that meet acceptable smoke dispersion levels determined by the Smoke Management Unit in Missoula, Montana.

United States Fish and Wildlife Service (USFWS)

The DNRC is managing for the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP), with the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP which can be found at www.dnrc.mt.gov/HCP.

3. ALTERNATIVE DEVELOPMENT:

Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why.

The No-Action and Action Alternatives are described in this section. The decisionmaker may select a modification or combination of these alternatives.

ALTERNATIVES CONSIDERED

- **No-Action Alternative**

Under this alternative no timber would be harvested and, therefore, no revenue would be generated for the Common Schools Trust. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and ongoing management requests may still occur. Natural events such as plant succession, tree mortality from insects and disease, windthrow, downed fuel accumulation, in-growth of ladder fuels, and wildfires would continue to occur.

- **Action Alternative**

The Action Alternative was developed to include timber harvesting while addressing the current forest and resource conditions within the project and cumulative effects areas. The primary concern within the project area is declining stand vigor and increased mortality resulting from various diseases and insects. Reconnaissance of the project area highlighted the following forest health concerns:

- High levels of dwarf mistletoe (*A. laricis*) have caused, and will continue to cause, mortality in the overstory.
- White pine blister rust is also present and contributing to mortality in the overstory.
- Spruce budworm has reduced stand vigor and caused mortality in the seedling/sapling strata throughout the project area.

During the design and development process for this project the following resource issues were also identified:

- Connectivity of mature forest throughout the project area.
- The high amount of disease present in the project area has resulted in the potential for less snags and snag recruits over time. Mitigations were designed to leave patches of snags (2 trees per acre \geq 21 inches) and future snag recruits (2 trees per acre \geq 21 inches) or the next largest size class available to meet snag retention requirements.
- Continue to provide hiding cover, nesting sites, and important habitat components for wildlife by maintaining 10-15 tons of coarse woody debris, emphasizing pieces to be \geq 15 inches, and meeting the snag and future snag recruit requirements.
- HCP guidelines mandate that all heavy machinery will be restricted from operating behind gated or barricaded roads during the spring period (April 1 through June 30) in the project area to mitigate for spring bear habitat.
- Current species composition has moved the existing cover types away from desired conditions. A combination of slashing undesirable species, scarifying to facilitate natural regeneration, and inter-planting western larch and western white pine would move cover types towards desired future conditions.

DETAILS

Under this alternative the silvicultural and harvest treatments would be to:

- Harvest approximately 500,000 board feet of timber from 46 acres;
- Regenerate new stands of healthy trees on 38 acres by implementing two silvicultural treatments: clearcut with reserves (8 acres) and seed tree with reserves (30 acres);
- Site preparation through slashing of advanced regeneration, scarification, and piling of excess slash;
- Planting and natural regeneration; and
- Improve the vigor and growth of residual overstory trees on 8 acres using a single tree selection improvement cutting.

Refer to *ATTACHMENT I – PROJECT MAP* and *ATTACHMENT II – PRESCRIPTION TABLE* for detailed descriptions of the harvesting methods and silvicultural prescriptions.

The road work associated with this project would include:

- Brushing approximately 1.8 mile of restricted roads off of the lower portion of Ewing Road;
- Final blading approximately 1.0 mile of restricted roads off of the lower portion of Ewing Road;
- Spraying herbicide for noxious weed control on the road segments listed above.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" if no impacts are identified or the resource is not present.*

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify direct, indirect, and cumulative effects to soils.

EXISTING CONDITIONS

The analysis area contains one (1) landtype (26C-8) (see Table S-1: Landtype Description for the Mistle Dog Project Area).

In the gross project area, DNRC has conducted timber harvesting since the 1930's. Timber sale records dating back to the 1930's indicate most of the proposed project area has been harvested using primarily ground-based yarding methods. Existing skid trails are spaced at between 60 and 120 feet apart, and none were identified as erosion or sediment sources. Trails are still apparent, but most are well vegetated and past impacts are beginning to ameliorate from freeze-thaw cycles and root penetration. Based on pace transects of trail spacing, knife penetration tests for compaction, and ocular estimates of re-vegetation, approximately 10% of previously ground-skidded harvest units are in an impacted condition in the proposed project area. Estimates of coarse woody debris in the analysis area were approximately 8 to 10 tons per acre on average, which is slightly below the recommended range of 7 to 20 tons per acre for similar habitat types (*Graham et al. 1994*).

Table S-1 – Landtype Description For The Mistle Dog Project Area

Land Type	Description	Soil Drainage	Road Limitations	Topsoil Displacement & Compaction	Seedling Establishment	Erosion (Bare Surface)
26C-8	Glacial Moraines, 20-40% slope	Well Drained	Moderate/High	Moderate/High	Good	Moderate

ENVIRONMENTAL EFFECTS

Soil Physical Properties

- **Direct, Indirect, and Cumulative Effects of the No-Action Alternative on Soil Physical Properties**

The No-Action Alternative would have no direct, indirect, or cumulative effects on soil physical properties. No ground-based activity would take place under this alternative, which would leave the soil in the project area unchanged from the description in the Existing Conditions portion of this analysis. Current impacts from past management would continue to recover as dictated by natural and pre-existing conditions.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative on Soil Physical Properties**

Based on DNRC soil monitoring on soils and sites similar to those found in the project area, direct impacts to soil physical properties would be expected on up to 4 of the total 46 acres proposed for harvesting in the proposed project area. Soil monitoring conducted on DNRC lands shows that sites harvested on DNRC lands statewide on similar soils with ground-based machinery had a range of impacts from 7.2 to 9.7 percent of the acres treated, with an average disturbance rate of 8.3% (*DNRC 2011*) (see TABLE S-2: Summary of Direct Effects of Alternatives on Soil Physical Properties). These impacts include operations on dry soils in non-winter conditions. As a result, the extent of impacts expected would likely be similar to those reported by DNRC soil monitoring (*DNRC 2011*), or approximately 7.2 to 9.7 percent of ground-based harvested acres. In addition,

BMPs and a combination of mitigation measures would be implemented to limit the area and degree of soil impacts as noted in ARM 36.11.422 and the SFLMP (DNRC 1996).

Cumulative effects to soil physical properties may occur from repeated entries into a forest stand where additional ground is impacted by equipment operations. Use of existing skid trails where compaction has begun to ameliorate through freeze-thaw cycles and revegetation would return to a higher level of impact under the Action Alternative. Additional trails may also be required if existing trails are in undesirable locations. Cumulative impacts to soil physical properties in previously-managed areas are still expected to fall below the range analyzed for in the EXPECTED FUTURE CONDITIONS section of the SFLMP and are expected to remain within the 20-percent impacted area established as a level of concern in the SFLMP (DNRC 1996).

Nutrient Cycling

- **Direct, Indirect, and Cumulative Effects of the No-Action Alternative on Nutrient Cycling**

The No-Action Alternative would have no direct, indirect, or cumulative effects on nutrient cycling. No harvesting activity would take place under this alternative, which would leave the woody debris levels in the project area unchanged from the description in the Existing Conditions portion of this analysis. Nutrient cycling from coarse woody debris would stay near current levels as dictated by natural and pre-existing conditions.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative on Nutrient Cycling**

Direct and indirect effects to nutrient cycling may include a slight increase in coarse woody debris from the Action Alternative in order to improve nutrient cycling capabilities. In addition, this alternative would lead to an increase in fine woody material in the form of limbs and tree tops being left after harvest. Through the timber sale contract, approximately 10 to 15 tons of coarse woody material would be left on the ground following harvesting activities, as well as fine material for nutrient retention.

Risk of cumulative effects to nutrient cycling from nutrient pool loss would be low. This alternative would follow research recommendations found in *Graham et al. (1994)* for retention of coarse and fine woody debris through contract clauses and site-specific mitigation measures.

Table S-2 – Summary of Direct Effects of Alternatives on Soil Physical Properties

Description of Parameter	No-Action Alternative	Action Alternative
Acres of Harvest	0	46
Acres of ground based yarding	0	46
Acres of ground based impacts ¹	0	3.9
Miles of new roads	0	0
Acres of new roads ²	0	0
Total estimated acres of impacts	0	3.9
Percent of harvest area with impacts	0%	8.3%

¹⁾ 8.3% of tractor units based on average impacts found on similar soils and sites by DNRC soil monitoring

²⁾ Assuming an average width of 25 feet, roads are approximately 3 acres per mile

Additional information can be found in the Project File: SOILS, which is located at the Stillwater Unit office.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.

EXISTING CONDITIONS

The project area includes 275 acres within the Dog Creek watershed in the Stillwater River drainage. Dog Creek supports fish; no other streams within the proposed project area contain fish.

Sediment delivery from in-channel sources was evaluated based on field reconnaissance in 2012. Stream channels in the project area were reviewed and are primarily in fair to good condition (Rosgen 1996). No areas of down-cut channels were identified during field reconnaissance. Large woody debris was found in adequate supply to support channel form and function. Little evidence of past Streamside Management Zone (SMZ) harvesting was found, and where past logging took place in the SMZ, no deficiency of existing or potential downed woody material to support hydrologic function was apparent in the streams.

Sediment delivery from out-of-channel sources was evaluated by reviewing the existing road system located within and leading to the proposed project area in 2011 in association with the Mystery Fish Timber Sale. The Mystery Fish analysis identified the known sources of sediment from the existing road system, and the project will implement applicable Best Management Practices (BMP's) on each of these sites. As a result, the existing sediment delivery to Dog Creek from in-channel sources is estimated to be 1.46 tons/year. Water yield for the Dog Creek watershed is currently 9.1%, which is well below the 12% threshold established for this watershed.

There are several small stream channels that have perennial flow for approximately 100-200 feet and then evidence of a channel disappears. These channels have bank full widths of approximately 1-2 feet, and flow mainly through cedar stands. Field reconnaissance showed these channels are stable and not actively eroding.

ENVIRONMENTAL EFFECTS

Sediment Delivery

- **Direct, Indirect and Cumulative Effects of the No-Action Alternative**

This Alternative would have no direct, indirect, or cumulative effects to sediment delivery beyond those currently occurring. Existing sources of sediment, both in-channel and out of channel would continue to recover or degrade based on natural or preexisting conditions.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative**

Direct and indirect effects of this alternative would be slightly reduced sediment delivery from current levels. With this alternative, erosion control and BMPs would be maintained or improved on up to 3.6 miles of existing road. Most of this work was completed with the Mystery Fish Timber Sale, and has brought most of the proposed haul route to applicable BMP standards. No new road construction is proposed with the Mistle Dog project.

There is a low risk of low impacts to sediment delivery from the proposed timber harvesting and skidding activities. The proposed project includes harvesting within the Riparian Management Zone (RMZ) and wetland adjacent to the SMZ of Dog Creek and the other Class 2 streams within and adjacent to the project area. This activity would pose a low risk of sediment delivery to the stream due to proximity to live water. This risk would be minimized through implementation of applicable BMPs, the SMZ Law and Forest Management Rules, as well as operation during periods of dry, frozen or snow-covered conditions. Since 1996, effectiveness of the SMZ width has been rated over 99 percent (DNRC 1990 through 2012). As a result, with the application of BMPs and the SMZ Law, proposed activities are expected to have a low to moderate risk of low impacts to sediment delivery.

Approximately 1.5 acres within the SMZ, RMZ and wetlands adjacent to the Dog Creek SMZ would be harvested under the Action Alternative. This activity would pose an elevated risk of sediment delivery due to proximity to live streams, but this risk would still be low. Crossing the adjacent wetland with ground based equipment to access this stand would require a site-specific alternative practice. Overall risk of adverse cumulative effects to sediment loading in the proposed project area and downstream is low. Implementation of BMPs, the SMZ Law, and Forest Management Rules would minimize risk of increased sediment delivery.

Water Yield

- **Direct, Indirect, and Cumulative Effects of the No-Action Alternative**

There would be no direct, indirect, or cumulative effects on water yield. Water quantity would not be changed from present levels, while historic harvest units regenerate returning to fully stocked forested conditions.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative**

There is a low risk of very low direct, indirect or cumulative effects to water yield from this alternative. Approximately 46 acres of timber would be harvested under this alternative within the proposed project area. The proposed treatment in most of these acres is seed tree harvest, with the remainder proposed for individual tree selection. It is a low risk that this level of harvesting would be sufficient to generate measurable increases in water yield in any streams located within or near the project area, or cause channel instability for the following reasons: 1) The limited extent of the proposal is within an 8,561-acre watershed, 2) The moderately well-drained to well-drained nature of the soils combined with gentle slopes and low gradients would produce little or no detectable change in water yield or channel form, 3) The streams and ephemeral draws within the project area are stable with well vegetated banks, making them capable of handling potential water yield increases without destabilizing, and 4) the proposed harvesting, combined with past management and the existing environment in Dog Creek would not put the watershed near its threshold of concern for water yield increases.

Fish Habitat

- **Direct, Indirect, and Cumulative Effects of the No-Action Alternative**

The No-Action Alternative would not affect fish habitat or fish populations in the Dog Creek watershed. Fish habitat and fish populations would continue to be affected by natural and pre-existing conditions, but would not be otherwise affected by this alternative.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative**

There is a low risk of low direct and indirect or cumulative effects to fish habitat from this alternative. The proposal would harvest timber from approximately 46 acres within the project area, with approximately 1.5 of these acres are proposed within the Dog Creek RMZ. As reported in the Sediment Delivery portion of this Environmental Assessment, these activities create a low risk of additional minor sediment delivery to Dog Creek due to operation of ground based equipment within a wetland adjacent to the Dog Creek SMZ. There is also expected to be a low risk of impacts to stream shading/stream temperature or recruitment of large woody debris from this alternative since all RMZ and SMZ rules would be implemented, resulting in no significant impacts to fish habitat or populations.

Refer to ATTACHMENT IV – WATER RESOURCES and ANALYSIS for in-depth evaluations of the No-Action and Action Alternatives.

6. AIR QUALITY:

What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

- **Direct, Indirect, and Cumulative Effects of the No-Action Alternative**

Under this alternative no timber harvest or related activities would occur and no slash piles would be burned resulting in the introduction of increased particulate matter.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative**

This project is located in Airshed 2. Some particulate matter may be introduced into the airshed during slash burning activities associated with this timber sale. As a result, slash burning would only be conducted when conditions favor good to excellent smoke dispersion and according to existing rules and regulations, thereby minimizing the potential impacts and length of exposure. Thus, direct, indirect, and cumulative effects to air quality are expected to be minimal.

During dry periods of the year, road dust may be created on gravel and dirt (native-surfaced) roads, relative to the amount of use. The log-hauling traffic from this proposed sale may increase by 6 to 12 truckloads per day. Depending on the season of harvest and the weather conditions, road dust may increase. In cases where the Forest Officer considers the dust level unacceptable, the application of dust abatement, such as magnesium chloride, may be required.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify direct, indirect, and cumulative effects to vegetation.

EXISTING CONDITIONS

The Forest Management Rules direct the DNRC to promote biodiversity by taking a coarse-filter approach that favors an appropriate mix of stand structures and composition on State Lands (ARM 36.11.404). The two cover types present within the proposed harvest units are mixed conifer (37 acres) and subalpine fir (9 acres). The desired future cover types for these units based on Stand Level Inventory (SLI) data is western larch/Douglas-fir (37 acres) and western white pine (9 acres).

The entire project area was first logged for sawlog volume in the late 1930's. This first entry removed both living and bug-killed large diameter western white pine individuals. A second entry was made in Section 19 in 1952 to remove small diameter cedar for post and pole material.

The major insects and diseases present are dwarf mistletoe and *Phellinus pini* rot (in the western larch and lodgepole pine), white pine blister rust, and spruce budworm. Various other stem and root rot exists throughout the sale area.

Noxious weeds are present along the roads within the project area; these include oxeye daisy, spotted knapweed, orange hawkweed, and St. Johnswort.

DNRC has adopted the minimum criteria described by *Green et al. (1992)* for the purpose of identifying potential old-growth stands on State Trust Lands. In the project area, the minimum criteria are 10 trees per acre (TPA) >21 inches dbh with an average age of 180 years. There are no stands in the project area that meet these requirements due to mortality caused by mistletoe. It is estimated that 2-3 TPA of this size and age class are suffering mortality annually.

Using the Natural Heritage Program (NHP) database, no sensitive, threatened, or endangered plant species have been documented within the project area.

ENVIRONMENTAL EFFECTS

• Direct, Indirect and Cumulative Effects of the No-Action Alternative

Timber harvesting would not occur at this time. None of the cover types or age class distributions would be directly or indirectly affected. Stocking levels of shade-tolerant trees and downed woody debris would increase within those stands over time. Various factors, such as insects, diseases, and weather events, would eventually cause more snags to occupy portions of the stands. This, in turn, would increase the potential and/or severity of a wildfire, and in the event that one was ignited, would make it harder to suppress.

In addition, none of the proposed units currently meet the desired future cover types defined for the project area. Species composition of these stands will continue to move further from desired future conditions as the dominant, preferred overstory species continue to decline, and subalpine fir, western red cedar, and Engelmann spruce persist as the major species present in the stand over time.

Additional mineral soil would not be exposed, and heavy tree canopies would continue to compete with weeds; therefore the risk of additional establishment of weed populations would not likely increase.

• Direct, Indirect, and Cumulative Effects of the Action Alternative

Under the proposed action:

- All 46 acres proposed for timber harvesting currently do not have cover types that are representative of the desired condition for these stands. With this alternative, 38 of the 46 acres would receive regeneration treatments to transition the current cover types towards the desired future condition (DFC) for these stands.
- Approximately 29 acres of mixed conifer would be converted to a western larch/Douglas-fir cover type.
- Approximately 9 acres of subalpine fir would be converted to a western white pine cover type.
- Approximately 38 acres would shift age classes from 150+ years to the '0-39 year' age class. Collectively, across the Stillwater Unit, the trend has been to apply silvicultural prescriptions to move cover types toward DFCs and age classes into the '0-39 year' age class.
- Harvest treatments applied in each unit would target individuals, and groups of trees impacted by mistletoe, white pine blister rust, and spruce budworm, reducing the amount of insects and disease in the area.

The spread of noxious weeds from the use of mechanized equipment and ground disturbance would be minimized by washing the equipment before entering the site, sowing grass seed on roads after road construction and harvesting (ARM 36.11.445), and applying herbicide on small patches of weed outbreaks along approximately 3 miles of roadway.

Additional information can be found in the Project File: *VEGETATION*, located at the Stillwater Unit office.

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify direct, indirect, and cumulative effects to fish and wildlife.

TERRESTRIAL AND AVIAN LIFE AND HABITATS

Existing Conditions

The proposed project area provides habitat for a variety of wildlife species, including a host of species that require mature forests and/or use snags and coarse woody debris. The project area contains approximately

163 acres of well-stocked, mature forest (59.3% of the project area). Old-growth forest habitat is not present within the project area. Existing levels of snags and downed woody debris are within the range expected for the habitat types present (*Graham et.al. 1994*) and are likely providing habitat for wildlife species utilizing these forest attributes. Deer, elk, and moose likely use the project area much of the year. Elk and moose winter range habitat is present within the project area and current habitat conditions are providing appreciable amounts of thermal cover and snow intercept.

Refer to ATTACHMENT V - WILDLIFE ANALYSIS for in-depth evaluation of the No-Action and Action Alternatives and notes pertaining to species potentially present in the project area.

AQUATIC LIFE AND HABITATS

Existing Conditions

Dog Creek is currently fish habitat to a population of westslope cutthroat trout within the project area. Westslope cutthroat trout are classified as S2 Montana Animal Species of Concern. Species classified as S2 are considered to be at risk due to very limited and/or potentially declining population numbers, range and/or habitat, making the species vulnerable to global extinction or extirpation in the state. The Department of Natural Resources and Conservation has also identified westslope cutthroat trout as a sensitive species (ARM 36.11.436).

Fish habitat in Dog Creek is affected by sediment levels in spawning gravel. Levels of sediment delivery are moderately low and likely present a low risk of impacts to fish habitat in the proposed project area. The primary threat to westslope cutthroat trout populations in the project area is from competitive displacement by nonnative species, especially eastern brook trout. The Mystery Fish Timber Sale EA gives a more in-depth discussion of these issues, and lists displacement of native fish by non-native species as a high impact. The issue of displacement of native westslope cutthroat trout by non-native species is an issue outside the scope of the project proposal, and will not be analyzed further in this analysis.

Environmental Effects

- **Direct, Indirect, and Cumulative Effects of the No-Action Alternative**

The No-Action Alternative would not affect fish habitat or fish populations in the Dog Creek watershed. Fish habitat and fish populations would continue to be affected by natural and pre-existing conditions, but would not be otherwise affected by this alternative.

- **Direct, Indirect, and Cumulative Effects of the Action Alternative**

There is a low risk of direct or indirect effects to fish habitat from this alternative. Approximately 46 acres of timber would be harvested under this alternative within the proposed project area, with approximately 1.5 of these acres proposed within the Dog Creek RMZ. These activities create a low risk of additional minor sediment delivery to Dog Creek due to operation of ground based equipment within a wetland adjacent to the Dog Creek SMZ. There is also expected to be a low risk of impacts to stream shading/stream temperature or recruitment of large woody debris from this alternative since all RMZ and SMZ rules would be implemented. Risk of adverse direct or indirect effects to fish habitat from this alternative are expected to be minimized by implementation of all applicable SMZ rules, and would satisfy ARM: 36.11.425(5) through 36.11.425(9).

There is a low risk of low cumulative effects to fish habitat from the proposed Action Alternative. As reported above, there is a low risk of low direct and indirect impacts from the Action Alternative due to harvesting activities within the Dog Creek RMZ, including sediment delivery, stream temperature and large woody debris recruitment. When these potential impacts are combined with the existing conditions, there is a low risk of adverse cumulative impacts to fish habitat.

Refer to ATTACHMENT IV – WATER RESOURCES ANALYSIS for in-depth evaluations of the No-Action and Action Alternatives.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify direct, indirect, and cumulative effects to these species and their habitat.

Suitable habitat for grizzly bear and Canada lynx is abundant and well connected in the project area. Both of these species likely use the proposed project area, and have been documented in the vicinity of the project area in the past. The project area does not contain any open roads and existing levels of disturbance are likely minimal.

The Northwestern Land Office "Sensitive Species List," as developed from the State Forest Management Plan, was also consulted. This list includes the following species: Bald Eagle, Black-Backed Woodpecker, Coeur d'Alene Salamander, Columbian Sharp-Tailed Grouse, Common Loon, Fisher, Flammulated Owl, Gray Wolf, Harlequin Duck, Northern Bog Lemming, Peregrine Falcon, Pileated Woodpecker, and Townsend's Big-Eared Bat. The following species were included for detailed study due to historical observations and habitat present within the proposed project area: Bald Eagle, Fisher, Gray Wolf and Pileated Woodpecker.

Refer to ATTACHMENT IV- WATER RESOURCE ANALYSIS and ATTACHMENT V- WILDLIFE ANALYSIS for in-depth evaluations of the No-Action and Action Alternatives and notes pertaining to species potentially present in the project area.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine direct, indirect, and cumulative effects to historical, archaeological or paleontological resources.

The DNRC has no record of cultural resources within the project's area of potential effect. However, a professional inventory of cultural resources has not been conducted. If previously unknown cultural or paleontological materials are identified during project-related activities, all work will cease until a professional assessment of such resources can be made.

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify direct, indirect, and cumulative effects to aesthetics.

- **Direct, Indirect and Cumulative Effects of the No-Action Alternative**

Under this alternative, no timber harvesting or related activities would occur. No changes in visual aesthetics would occur outside of natural events.

- **Direct, Indirect and Cumulative Effects of the Action Alternative**

The proposed project area is not located on any prominent topographic position or visible from any densely populated areas, but Units 3 and 5 would be visible from open roads although there would be minimal harvesting within the first 100 feet of the road. Following harvest, landings and slash would be visible from the Main Ewing Road. As a result, all forest improvement work and burning of slash piles would be planned within a year of harvest, expediting the recovery of the vegetation, mitigating the impacts of logging.

Overall, timber sale design would minimize the visual impacts to foreground views by randomly spacing leave trees, and by keeping a textured, uneven look to the boundary/new seed wall.

Thus, direct, indirect, and cumulative impacts to aesthetics are expected to be minimal.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify direct, indirect, and cumulative effects to environmental resources.

There is no demand for limited environmental resources in this project area or from any other nearby activities. Therefore no direct, indirect, or cumulative effects would occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

- Ewing Central Timber Sale Project Checklist Environmental Assessment (CEA) (January 2013)
- Lazy Swift II Timber Sale Project CEA (January 2013)
- Mystery Fish Timber Sale Project Environmental Assessment (EA) (March 2012)
- Fish Bull Face Timber Sale Project CEA (April 2012)
- Final Habitat Conservation Plan/EIS (USFWS/DNRC) (September 2010)
- Duck to Dog Timber Sale Project EA (May 2007)
- Dog Meadow Timber Sale Project EA (January 2003)

IV. IMPACTS ON THE HUMAN POPULATION
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- | |
|--|
| <ul style="list-style-type: none">• <i>RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.</i>• <i>Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.</i>• <i>Enter "NONE" if no impacts are identified or the resource is not present.</i> |
|--|

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

No unusual safety considerations are associated with the proposed timber sale. Warning signs would be located along Ewing Road and Highway 93 cautioning recreational and residential traffic of logging activities.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

The proposed timber sale would continue to provide industrial production in the region.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and cumulative effects to the employment market.

Due to the relatively small size of the proposed timber sale, there would be no measurable direct, indirect, or cumulative effects to the employment market. However, according to a report issued by the Bureau of Business and Economic Research (2008), an average of 10.0 jobs per million board feet of timber harvested is maintained in the timber industry.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify direct, indirect, and cumulative effects to taxes and revenue.

Due to the relatively small size of the proposed timber sale, no measurable direct, indirect, or cumulative impacts to the tax base or tax revenue would be likely from either alternative.

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify direct, indirect, and cumulative effects of this and other projects on government services

A temporary increase in traffic would occur on U.S. Highway 93 resulting from log trucks hauling to and from the purchasing mill. This temporary increase on Highway 93 is a regular occurrence on public roads in northwest Montana and no additional government service would be required.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

There are no locally adopted environmental plans for this area.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify direct, indirect, and cumulative effects to recreational and wilderness activities.

Ewing Road, situated off of Highway 93, is a seasonally maintained (Spring/Summer/Fall) forest access road that travels through the sections of the Stillwater State Forest located to the east of Upper Stillwater Lake. The Ewing Road is used primarily to access hiking, huckleberry picking, hunting and firewood cutting locations on the Stillwater State Forest and is not plowed during the winter months.

Concentrated recreation also occurs within the project area. The concentrated recreation is in the form of a commercial recreation licensee with a current land use license to use portions of the Ewing Road during the winter season. This project would share 1.7 miles of the Ewing Main Road if logging occurred during the winter. If winter operations were to occur, mitigations would be applied to accommodate both logging and activities associated with the licensee.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify direct, indirect, and cumulative effects to population and housing.

No measurable direct, indirect, and cumulative impacts related to population and housing would be expected under either alternative due to the relatively small size of the proposed timber sale project.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

No direct, indirect, and cumulative impacts related to social structures and mores would be expected under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

No direct, indirect, and cumulative impacts related to cultural uniqueness and diversity would be expected under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.

- **Direct, Indirect and Cumulative Effects of the No-Action Alternative**

No revenue would be generated for the Common Schools Trust at this time. Small timber permits could yield some additional revenue.

- **Direct, Indirect and Cumulative Effects of the Action Alternative**

The timber harvest would generate approximately \$124,844.00 for the Common Schools Trust and approximately \$12,620.00 in Forest Improvement (FI) fees would be collected for FI projects. This is based on a stumpage rate of \$46.00 per ton, multiplied by the estimated volume of tons. This stumpage rate was derived by comparing attributes of the proposed timber sale with the attributes and results of other DNRC timber sales recently advertised for bid. Costs related to the administration of the timber sale program are only tracked at the Northwestern Land Office (NWLO) and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated Statewide and by Land Office. From 2006 through 2010, revenue-to-cost ratio of the NWLO was 2.51. This means that, on average, for every \$1.00 spent in costs, \$2.51 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

EA Checklist Prepared By:	Name: Tony Nelson, Chris Forristal, Scott Robinson	Date: 6/10/2013
	Title: Hydrologist, Wildlife Biologist, Management Forester	

V. FINDING

25. ALTERNATIVE SELECTED:

Upon Review of the Checklist EA and attachments, I find the Action Alternative, as proposed, meets the intent of the project objectives as stated in Section I – *Type and Purpose of Action*. The lands involved in this project are held by the State of Montana in trust for the support of specific beneficiary institutions and DNRC is required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X Section 11; and, 77-1-212 MCA*). The Action Alternative complies with all pertinent environmental laws, the DNRC SFLMP and HCP, and is based upon a consensus of professional opinion on limits of acceptable environmental impact. For these reasons, I have selected the Action Alternative to be implemented on this project.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

After a review of the scoping documents, project file, Forest Management Rules, SFLMP and HCP checklists, and Department policies, standards, and guidelines, I find that all of the identified resource management concerns have been fully addressed in this Checklist EA and its attachments. Specific project design features and various recommendations by the resource management specialists have been implemented to ensure that this project will fall within the limits of environmental change. Taken individually and cumulatively, the proposed activities are common practices, and no project activities are being conducted on important fragile or unique sites. I find there will be no significant impacts to the human environments as a result of implementing the Action Alternative. In summary, I find that the identified adverse impacts will be controlled, mitigated, or avoided by the design of the project to the extent that the impacts are not significant.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:☐

EIS

☐

More Detailed EA

☒

No Further Analysis

EA Checklist Approved By:	Name: Mike McMahon
	Title: Forest Management Supervisor, DNRC Stillwater Unit
Signature: /s/ Mike McMahon	
Date: 6/11/2013	

Proposed Mistle Dog Timber Sale Project

T 33N R 23 W

T 33N R 22W

13 Molly Lake

18

17

16

Ewing Road

Stryker Face Road

Dog Creek

19

20

21

To Stryker

Highway 93

To Whitefish

25


30





8







Z.S.M 4-2013 0 0.25 0.5 1 Miles

Legend



-  Streams
-  Harvest Units
-  Reserve Tree Area
-  Section Lines

Roads

-  HIGHWAY
-  OPEN
-  RESTRICTED
-  Haul Route

Attachment II:
PRESCRIPTION TABLE

Unit number	Acres/ MBF	Prescription	Marking guides	Particulars involved in unit
1	20 Acres 215 MBF	Seedtree w/ reserves	Leave Tree Mark: <ul style="list-style-type: none"> Mark 7-9 seedtrees per acre (75' to 80' spacing); Species designated to leave = WL, DF and WWP; Where no species designated to leave are present mark 3-6 spruce or cedar trees within 20' of each other; Keep up to 2 snags and 2 snag recruits per acre >21" DBH. 	<ul style="list-style-type: none"> - There is a heavy component of dwarf mistletoe in the western larch; - Some larch are dead due to the infection of dwarf mistletoe but are still valuable for lumber; - Slash sub merchantable regeneration; areas of advanced regeneration with good vigor and form can be left in clumps; - Maintain 10 to 15 tons of coarse woody debris per acre; - Excavator scarify and pile logging slash; - Plant with western larch and western white pine.
2	9 Acres 196 MBF	Seedtree w/ reserves	Leave Tree Mark: <ul style="list-style-type: none"> Mark 7-9 seedtrees per acre (75' to 80' spacing); Species designated to leave = WL, DF and WWP; Keep up to 2 snags and 2 snag recruits per acre >21" DBH; Leave tree mark up to 50% of the trees > 8" DBH between the RMZ and SMZ along northeastern unit boundary. 	<ul style="list-style-type: none"> - There is a heavy component of dwarf mistletoe in the western larch; - Some larch are dead due to the infection of dwarf mistletoe but are still valuable for lumber; - The eastern boundary of the unit is the SMZ for Dog Creek, a Class I stream; - There is an interior SMZ that surrounds an associated wetland. An alternative practice application is required to cross the associated wetland at specific locations. The associated wetland surrounds 2.3 acres of timber that contains dead and dying mistletoe infected larch; - RMZ buffer exists along the eastern edge of the unit. Maintain 50% of trees >8" dbh between the RMZ boundary and the SMZ boundary; Protect shrubs and sub-merchantable timber; - A reserve tree area that borders Unit 2 on the northeastern boundary will be left to provide snags and snag recruits for wildlife benefits; - ERZ's exist around isolated wetlands, marked with "Xs"; - Maintain 10 to 15 tons of coarse woody debris per acre; - Excavator scarify and pile logging slash; - Plant with western white pine and western larch.

Mistle Dog Timber Sale Checklist Environmental Assessment

3	8 Acres 68 MBF	Clearcut w/ reserves	Leave Tree Mark: <ul style="list-style-type: none"> • Leave 4-6 seedtrees per acre (90' to 110' spacing); • Species designated to leave = WL and DF; • Keep up to 2 snags and 2 snag recruits per acre >21" DBH; • Leave tree mark at least 50% of the trees > 8" DBH between the RMZ and SMZ along northeastern unit boundary. 	<ul style="list-style-type: none"> - There is a heavy component of dwarf mistletoe in the western larch; - The eastern boundary of the unit is the SMZ for Dog Creek, a Class I stream; - RMZ buffer exists along the northeastern edge of the unit. Maintain 50% of trees >8" dbh between the RMZ boundary and the SMZ boundary; Protect shrubs and sub-merchantable timber; - A reserve tree area that borders Unit 3 on the southeastern boundary will be left to provide snags and snag recruits for wildlife benefits; - ERZ's exist around isolated wetlands, marked with "Xs"; - Slash sub merchantable regeneration, areas of advanced regeneration with good vigor and form can be left in clumps; - Maintain 10 to 15 tons of coarse woody debris per acre; - Excavator scarify and pile logging slash; - Plant with western white pine and western larch.
4	1.3 Acres 22 MBF	Seedtree w/ reserves	Cut Tree Mark: <ul style="list-style-type: none"> • Leave 7-9 seedtrees per acre (75' to 80' spacing); • Species designated to leave = WL and DF; • Keep up to 2 snags and 2 snag recruits per acre >21" DBH; • Cut tree mark disease infested trees in SMZ; • Retain at least 50% of the trees >8" DBH in the SMZ. 	<ul style="list-style-type: none"> - There is a very heavy component of dwarf mistletoe in the western larch; - Some larch are dead due to the mistletoe but still are valuable for lumber; - The northwestern boundary of the unit is an SMZ for a Class II stream; - Harvesting of dwarf mistletoe infested larch will take place in the Class II SMZ; - Slash sub merchantable regeneration, areas of advanced regeneration with good vigor and form can be left in clumps; - Maintain 10 to 15 tons of coarse woody debris per acre; - Excavator scarify and pile logging slash.
5	8 Acres 15 MBF	Individual tree selection	Cut Tree Mark: <ul style="list-style-type: none"> • Leave > 40% canopy cover; • Species designated to leave = WL and DF; • Keep up to 2 snags and 2 snag recruits per acre >21" DBH. 	<ul style="list-style-type: none"> - Western larch on the southeastern end of the unit are heavily infested with dwarf mistletoe; - Multiple short segments of creeks that flow subterraneous are present; - Harvesting of dwarf mistletoe infested larch will take place in the Class III SMZ's associated with the short creek segments. - Maintain 10 to 15 tons of coarse woody debris per acre;

NOTES: ERZ=Equipment Restriction Zone; TPA=Trees Per Acre; LTM=Leave Tree Mark; SMZ=Streamside Management Zone; RMZ=Riparian Management Zone

Attachment III: **STIPULATIONS AND SPECIFICATIONS**

Stipulations and specifications for the Action Alternative include project design provisions that follow commitments of the Habitat Conservation Plan, Forest Management Rules, relevant laws and regulations. They also include mitigations that were designed to avoid or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by, and occurring during the contract period, would be contained within the Timber Sale Contract. As such, they are binding and enforceable. Project administrators would enforce stipulations and specifications relating to activities such as hazard reduction, site preparation, and planting, that may occur during or after the contract period.

The following stipulations and specifications would be incorporated into the selected action alternative to mitigate potential effects of resources.

Aesthetics

- Damaged residual vegetation visible from open roads would be slashed.
- The size and number of landings would be limited.
- Disturbed soil sites along road right-of-ways would be grass-seeded.
- Leave trees are to be left with both even and clumpy distributions.
- A higher concentration of trees would be left within 100-foot buffers in units along the Lower Ewing Road and Ewing Road.

Air Quality

- To minimize cumulative effects during burning operations, burning would be done in compliance with the Montana Airshed Group, reporting regulations and any burning restrictions imposed in Airshed 2. This would provide for burning during conditions of acceptable ventilation and dispersion.
- Dozer, excavator, landing, and roadwork debris would be piled clean to allow ignition during fall and spring when ventilation is good and surrounding fuels are wet. The Forest Officer may require that piles be covered so the fuels are drier, ignite easier, burn hotter, and extinguish sooner.

- In order to reduce smoke production, some large woody debris would be left in the woods to minimize the number of burn piles.
- Dust abatement may be applied on some road segments, depending on the seasonal conditions and level of public traffic.

Archaeology

- A contract clause provides for suspending operations if cultural resources were discovered; operations in that area may only resume as directed by the Forest Officer following consultation with a DNRC Archeologist.
- If cultural resources were discovered, the Confederated Salish-Kootenai Tribe would be notified.

Fisheries

- Apply all applicable Forestry Best Management Practices (BMPs), including the Streamside Management Zone (SMZ) Law and Rules, HCP commitments, and Forest Management Rules for fisheries, soils, and watershed management (*ARMs 36.11.425 and 36.11.426*).
- Apply the SMZ Law and Rules to all streams.
- Monitor all road/stream crossings for sedimentation and deterioration of road prism.
- Only allow equipment traffic at road/stream crossings when road prisms have adequate load-bearing capacity, thus reducing the potential for rutting.
- Dog Creek Road and an unnamed restricted forest road to the south would be brushed and would have improvements made to the surface and ditches to meet BMPs.

Noxious Weed Management

- All tracked and wheeled equipment would be cleaned of noxious weeds prior to beginning project operations.
- Disturbed roadside sites would be promptly revegetated with a native grass seed mix. Roads used and closed as part of this proposal would be reshaped and reseeded with grass seed.
- DNRC would spray weeds on restricted roads that will be used for log hauling in the project area.

Recreation

- Coordination would take place with the winter recreation licensee as to timing of hauling, etc.
- Information would be disseminated to the public through signage, press releases, and pre-operation meetings with DNRC winter recreation lease holders.
- The Stillwater Block Transportation Plan as described in the HCP would apply for all road use.

Soils

Soil Compaction and Displacement

- Logging equipment would not operate off forest roads unless oven-dry soil moisture is less than 20 percent, frozen, or sufficiently snow-covered to minimize soil compaction and rutting, and maintain drainage features.
- Existing skid trails and landings would be used where their design is consistent with prescribed treatments and meets current BMP guidelines.
- To reduce the number of skid trails and the potential for erosion, designated skid trails would be required where moist soils or short steep pitches (less than 300 feet) would not be accessed by other logging systems.
- Skid trail density in a harvest area would not exceed 20 percent of the total area in a cutting unit.
- Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest unit. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent, unless the operation can be completed without causing excessive erosion. Consider disturbance incurred during skidding operations to, at least partially provide scarification for regeneration. A majority of all feasible fine litter and 10 to 15 tons of large woody debris would be retained following harvesting (*ARM 36.11.410 and 36.11.414*).

Erosion

- Ground-skidding machinery would be required to be equipped with winchline to limit equipment operations on moist or steeper slopes.
- Roads used by the purchaser would be reshaped and the ditches redefined following use to reduce surface erosion.
- Based on ground and weather conditions, water bars, logging-slash barriers and, in some cases, temporary culverts would be installed on skid trails where erosion is anticipated, and

as directed by the Forest Officer. These erosion-control features would be periodically inspected and maintained throughout the contract period or extensions thereof.

Vegetation

- All harvest areas shall have a minimum of 2 snags and 2 snag-recruits over 21 inches dbh, or the next largest size class available. Additional large-diameter recruitment trees may be left if sufficient large snags are not present. These snags and recruitment trees may be clumped or evenly distributed throughout the harvest units.
- A 1.5 acre reserve tree area located adjacent to the SMZ of Dog Creek and proposed harvest units 2 and 3 contains more than 25 large-diameter trees and, through project design, was retained to allow the harvest of merchantable snags as well as other mistletoe-infested western larch scattered throughout units 1 through 3. These trees are to be posted with “wildlife tree” placards.
- In addition, certain portions of the harvest areas would be left uncut; these areas may include large healthy trees, snag patches, small healthy trees, SMZs, small wetlands, etc.

Watershed

- Streamside Management Zones (SMZs) and Riparian Management Zones (RMZs) would be defined along those streams and/or wetlands where they occur within, or adjacent to, harvest areas. This project would meet or exceed SMZ and RMZ rules.
- Brush would be removed from existing road prisms to allow for effective road maintenance. Road maintenance can help reduce sediment delivery.
- The contractor would be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.,) that may affect water quality.
- Segments of temporary road would be reclaimed to near-natural levels following the sale.
- The BMP audit process will continue. This project would likely be reviewed in an internal audit, and may be selected at random as a statewide audit site.

Wildlife

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (*ARM 36.11.428 through 36.11.435*).

- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per GB-PR2 (*USFWS AND DNRC 2010, Vol. II p. 2-5*).
- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (*USFWS AND DNRC 2010, Vol. II p. 2-6*).
- Manage road closures and restrictions in accordance with the Stillwater Block HCP transportation plan as per GB-ST1 (*USFWS AND DNRC 2010, Vol. II p.2-21*)
- Public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).
- Restrict commercial harvest and motorized activities on seasonally restricted roads (refer to Stillwater Block HCP transportation plan) to reduce disturbance to grizzly bears from April 1-June 15 during the Spring Period (*GB-NR3, USFWS AND DNRC 2010, Vol. II pp. 2-11, 2-12*).
- In a portion of harvest units retain patches of advanced regeneration of shade-tolerant trees as per LY-HB4 (*USFWS AND DNRC 2010, Vol. II pp. 2-50, 2-51*).
- Manage for snags, snag recruits, and coarse woody debris, particularly favoring western larch, Douglas-fir, and western red cedar. Emphasize the retention of downed logs ≥ 15 inches dbh where they occur as per LY-HB2 (*USFWS AND DNRC 2010, Vol. II p. 2-48*).
- Close roads and trails to the extent possible following the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering.
- Use a combination of topography, group retention, and roadside vegetation to reduce sight distances within harvest units and along open roads where feasible as per GR-NR4 and GR-RZ2 (*USFWS AND DNRC 2010, Vol. II p. 2-13 to 14, 2-17*).
- Retain 1 ½ acres of healthy, large diameter western larch, western red cedar, and Douglas-fir in a reserve tree area between harvest units 2 and 3 in order to supplement DNRC's snag and future snag recruitment.

Attachment IV: WATER RESOURCES ANALYSIS

INTRODUCTION

Project Area and Project Activities

The gross project area includes 275 acres within the Stillwater State Forest. The affected area is the Dog Creek watershed in the Stillwater River drainage. This watershed includes land managed by Plum Creek Timber Company, non-industrial private ownership, and DNRC ownership. The proposed Action Alternative would include ground based yarding methods to harvest timber on approximately 46 acres within the project area. No new road construction is proposed to access the project area stands.

Resource Description

Water yield and sediment delivery will be considered in this analysis. Water yield increases (WYI) can affect channel stability if dramatically altered, and sediment delivery from both in-channel and introduced sources is a primary component of overall water quality in a watershed.

Issues and Measurement Criteria

The following issues encompass the specific issues and concerns raised through public comment and scoping of the proposed project. For a specific list of individual comments and concerns, please refer to the project file.

- ***Sediment Delivery***

Timber harvesting and related activities, such as road construction, can lead to water-quality impacts by increasing the production and delivery of fine sediment to streams. Construction of roads, skid trails, and landings can generate and transfer substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosive power of stream flows.

Measurement Criteria: Tons of sediment delivery per year from roads and stream crossing will be evaluated using procedures adapted from the Washington Forest Practices (WFP) Board (*Callahan 2000*). The potential for sediment delivery from harvesting activities and vegetative removal will be analyzed qualitatively through data collected in the BMP audit process.

- ***Water Yield***

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal (*Haupt 1976*), because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition. Vegetation removal can also reduce peak flows by changing the timing of snowmelt. Openings will melt earlier in the spring with solar radiation and have less snow available in late spring when temperatures are warm. This effect can reduce the synchronization of snowmelt runoff and lower peak flows.

Measurement criteria: Annual water yield and peak flow duration and timing will be addressed qualitatively.

- ***Fish Habitat***

Fish habitat can be affected in three primary ways by timber harvesting through the following: 1) introduction of fine sediment to spawning habitat as a result of road construction and use, and ground-based equipment operation, 2) stream temperature can be increased if trees that provide shade to a stream are removed, and 3) large woody debris in streams can be reduced if trees are removed that have the potential to fall into or across a stream.

Measurement criteria: Qualitative discussion of potential risks to sediment delivery, stream shading and large woody debris.

Analysis Area

- ***Sediment Delivery***

Direct, indirect and cumulative effects to sediment delivery will be analyzed on all existing and proposed roads in and leading to the proposed project area. This area was chosen as an appropriate scale of analysis for the WFP method, and will effectively display the estimated impacts of proposed activities. Additional sites not located within the project area will be assessed qualitatively for their potential to affect downstream water.

- ***Water Yield***

Direct, indirect and cumulative effects to water yield will be analyzed within the intermittent and ephemeral face drainages found within the proposed project area.

- ***Fish Habitat***

Direct, indirect and cumulative effects to fish habitat will be analyzed in the Dog Creek watershed, specifically where proposed harvest areas are adjacent to the main stem of Dog Creek.

Analysis Methods

Each of the analyses below was conducted on a site specific basis. All proposed harvest and road use for this project are found on State land. For cumulative effects analyses, all existing and proposed DNRC activities were considered.

- ***Sediment Delivery***

Sediment delivery analysis from roads was completed using a sediment-source inventory. All roads and stream crossings were evaluated to determine sources of introduced sediment. Data was collected in 2011 to quantify sediment delivery from roads using procedures adapted from the WFP Board (*Callahan, 2000*). In addition, in-channel sources of sediment were identified using channel-stability rating methods developed by *Pfankuch (1975)* and through the conversion of stability rating to reach condition by stream type developed by *Rosgen (1996)*. These analyses were conducted in 2011 and 2012 by a DNRC hydrologist.

In addition, sediment from harvesting activities and vegetative removal will be analyzed qualitatively through field reconnaissance and data collected during past statewide and DNRC internal BMP field reviews.

- ***Water Yield***

The water yield increase for project area was determined using field review, aerial photo interpretation and harvest history information gathered during the Mystery Fish Timber Sale analysis. Visual inspection of the runoff patterns and stream channel stability within the proposed project area were used to assess the impacts of past management to water yield. Aerial photo interpretation was used to determine the extent of past management in project area drainages.

- ***Fish Habitat***

Fish habitat was analyzed using a qualitative assessment of sediment delivery risk, stream temperature changes and large woody debris recruitment.

Relevant Agreements, Laws, Plans, Rules, and Regulations

Montana Surface Water-Quality Standards

According to the Montana Surface Water Quality Standards found in *ARM 17.30.608 (1)(a)*, this portion of the Stillwater River drainage, including Dog Creek, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment,

and minimal increases over natural turbidity. "Naturally occurring," as defined by ARM 17.30.602 (19), includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (commonly called Best Management Practices or BMPs) have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that could create impacts.

Designated beneficial water uses within the project area include cold-water fisheries and recreational use in the streams, wetlands, and lakes in the surrounding area. There are five (5) existing surface water rights on Dog Creek that include commercial, domestic, industrial and lawn & garden. Domestic use refers to water rights assigned to individual property owners for uses such as eating, drinking, laundering, bathing, lawn watering and watering a household garden. All of these surface water rights are located well downstream of the proposed project area, and are located below Dog Lake.

Water Quality Limited Waterbodies

None of the streams in the proposed project area are currently listed as water-quality-limited waterbodies in the 2010 Montana 303(d) list (DEQ, 2010).

Portions of the Stillwater River located downstream from the proposed project area are currently listed as a water quality limited water body in the 2010 303(d) list. The 303(d) list is compiled by the Montana Department of Environmental Quality (DEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired. These water bodies are then characterized as "water quality limited" and thus targeted for Total Maximum Daily Load (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a water body or watershed. Each contributing source is allocated a portion of the allowable limit. These allocations are designed to achieve water quality standards.

The Montana Water Quality Act (MCA 75-5-701-705) also directs the DEQ to assess the quality of state waters, insure that sufficient and credible data exists to support a 303(d) listing and to develop TMDL for those waters identified as threatened or impaired. Under the Montana TMDL Law, new or expanded nonpoint source activities affecting a listed water body may commence and continue provided they are conducted in accordance with all reasonable land, soil and water conservation practices. Total Maximum Daily Loads have not been completed for the Stillwater River. DNRC will comply with the Law and interim guidance developed by DEQ through implementation of all reasonable soil and water conservation practices, including Best Management Practices and Forest Management Rules (ARM 36.11.401 through 36.11.450).

The current listed causes of impairment in the Stillwater River are alteration in stream-side or littoral vegetative covers, unknown impairment, nitrates, phosphorus (total), and sedimentation/siltation. The probable sources for the Stillwater River are site clearance (land development), unknown sources, and loss of riparian habitat.

Montana SMZ Law

By the definition in ARM 36.11.312 (3), Dog Creek is a Class 1 stream. It flows perennially, contains fish and contributes flow to another body of water. By the definition in ARM 36.11.312 (4)(a), the remainder of the streams in the project area are classified as a Class 2 streams. They flow more than 6 months per year, do not contain fish and do not contribute surface flow to a lake, stream or other body of water.

Forest Management Rules

In 2003, DNRC drafted Administrative Rules for Forest Management. The portion of those rules applicable to watershed and hydrology resources include ARM 36.11.422 through 426. All applicable rules will be implemented if they are relevant to activities proposed with this project.

Habitat Conservation Plan

In 2011, DNRC adopted a Habitat Conservation Plan (HCP) in coordination with the United States Fish and Wildlife Service. All applicable HCP riparian timber harvest and aquatic conservation strategies (DNRC, 2010) would be implemented if they are relevant to activities proposed with this project.

EXISTING ENVIRONMENT

Introduction

The proposed project lies entirely within the Dog Creek watershed. Precipitation averages approximately 30 inches annually in and around the proposed project area. Dog Creek supports fish; no other streams within the proposed project area contain fish.

Sediment Delivery

Sediment delivery from the existing road system was evaluated using sediment-source reviews conducted by DNRC hydrologists in 2011.

Sediment delivery from in-channel sources was evaluated based on field reconnaissance in 2012. Stream channels in the project area were reviewed and are primarily in fair to good condition. Dog Creek is classified as a B3 channel using a classification system developed by Rosgen (1996). Channel types rated as “B” are typically in the 2- to 4-percent gradient range, and have a moderate degree of meander (sinuosity). Channel-bed materials in B3 types are mainly cobble. Given the cobble content and the gradient of these stream types, bed materials commonly move. No areas of down-cut channels were identified during field reconnaissance.

Large woody debris was found in adequate supply to support channel form and function. Woody material in a stream provides traps for sediment storage and gradient breaks to reduce erosive energy and work as flow deflectors to reduce bank erosion. Little evidence of past SMZ harvesting was found, and where past logging took place in the SMZ, no deficiency of existing or potential downed woody material to support hydrologic function was apparent in the streams.

Sediment delivery from out-of-channel sources was evaluated by reviewing the existing road system located within and leading to the proposed project area. This review was conducted in 2011 in association with the Mystery Fish Timber Sale. The Mystery Fish analysis identified the known sources of sediment from the existing road system, and the project will implement applicable BMPs on each of these sites. As a result, the existing sediment delivery to Dog Creek from out-of-channel sources is estimated to be 1.46 tons/year. These are estimates based on the methodology described above and not measured values.

Water Yield

Water yield in Dog Creek has been affected by past activities in and around the proposed project area, including timber management and gravel pit development. These activities have led to reductions in forest canopy cover, and construction of roads. Following field reconnaissance of the proposed project area, it was determined that a detailed water yield analysis would not be necessary in the proposed project area for the reasons stated below. The water yield impacts of all roads were considered in the following assessments.

Water yield for the Dog Creek watershed is currently 9.1%, which is below the 12% threshold established for this watershed. This value includes the harvesting from the Mystery Fish Timber Sale in the higher elevations of the Dog Creek watershed. Stands in the proposed project area have not been managed since the early 1980s and prior to that not since the 1950s. Past timber management activities have had no visible effect on the stream channels or draws located in the project area. Due to the stable nature of Dog Creek and the limited extent of the proposed harvesting, there is a low risk for existing impacts to water yield, and a detailed analysis of watershed cumulative effects is not necessary for this parcel (ARM 36.11.423).

There are several small stream channels that have perennial flow for approximately 100 to 200 feet and then evidence of a channel disappears. These channels have bank full widths of approximately 1 to 2 feet, and flow mainly through cedar stands. Field reconnaissance showed these channels are stable and not actively eroding.

Fish Habitat

Dog Creek is currently fish habitat to a population of westslope cutthroat trout within the project area. Westslope cutthroat trout are classified as S2 Montana Animal Species of Concern. Species classified as S2 are considered to be at risk due to very limited and/or potentially declining population numbers, range and/or habitat, making the species vulnerable to global extinction or extirpation in the state. The Department of Natural Resources and Conservation has also identified westslope cutthroat trout as a sensitive species (ARM 36.11.436).

Fish habitat in Dog Creek is affected by sediment levels in spawning gravel. Levels of sediment delivery reported above are moderately low, and likely present a low risk of impacts to fish habitat in the proposed project area. As reported in the sediment delivery portion of this analysis, no impacts to stream shading or large woody debris levels were apparent during field reconnaissance. The primary threat to westslope cutthroat trout populations in the project area is from competitive displacement by nonnative species, especially eastern brook trout. The Mystery Fish Timber Sale EA gives a more in-depth discussion of these issues, and lists displacement of native fish by non-native species as a high impact. The issue of displacement of native westslope cutthroat trout by non-native species is an issue outside the scope of the project proposal, and will not be analyzed further in this analysis.

ENVIRONMENTAL EFFECTS

Sediment Delivery

- ***Direct and Indirect Effects of the No-Action Alternative to Sediment Delivery***

This Alternative would have no direct or indirect effects to sediment delivery beyond those currently occurring. Existing sources of sediment, both in-channel and out of channel would continue to recover or degrade based on natural or preexisting conditions.

- ***Direct and Indirect Effects of the Action Alternative to Sediment Delivery***

Direct and indirect effects of this alternative would be slightly reduced sediment delivery from current levels. With this alternative, erosion control and BMPs would be maintained or improved on up to 3.6 miles of existing road. Most of this work was completed with the Mystery Fish Timber Sale, and has brought most of the proposed haul route to applicable BMP standards. Some additional roads would be used with this project that were not used in the Mystery Fish project. None of these additional roads had existing erosion or sediment delivery problems identified during field reconnaissance. No new road construction is proposed with the Mistle Dog project.

There is a low risk of low impacts to sediment delivery from the proposed timber harvesting and skidding activities. The proposed project includes harvesting within the RMZ and wetland adjacent to the SMZ of Dog Creek and the other Class 2 streams within and adjacent to the project area. This activity would pose a low risk of sediment delivery to the stream due to proximity to live water. This risk would be minimized through implementation of applicable BMPs, the SMZ Law and Forest Management Rules, as well as operation during periods of dry, frozen or snow-covered conditions. Approximately 1.5 acres within the SMZ, RMZ and wetlands adjacent to the Dog Creek SMZ would be harvested under the Action Alternative. This activity would pose an elevated risk of sediment delivery due to proximity to live streams, but this risk would still be low. Crossing the adjacent wetland with ground based equipment to access this stand would require a site-specific alternative practice. Overall risk of adverse cumulative effects to sediment loading in the proposed project area and downstream is low.

The SMZ law, Administrative Rules for Forest Management, and applicable BMPs would be applied to all harvesting activities, which would minimize the risk of sediment delivery to draws and streams. The Montana BMP audit process has been used to evaluate the application and effectiveness of forest-management BMPs since 1990; this process has also been used to evaluate the application and effectiveness of the SMZ Law since 1996. During that time, evaluation of ground-based-skidding practices near riparian areas has been rated 92-percent effective, and these same practices have been found effective over 99 percent of the time from 1998 to present (*DNRC 1990 through 2012*). Since 1996, effectiveness of the SMZ width has been rated over 99 percent (*DNRC 1990 through 2012*). As a result, with the application of BMPs and the SMZ Law, proposed activities are expected to have a low risk of low impacts to sediment delivery.

- ***Cumulative Effects of the No-Action Alternative to Sediment Delivery***

The cumulative effects to sediment delivery would be very similar to those described in the existing conditions portion of this analysis. All existing sources of sediment would continue to recover or degrade as dictated by natural and preexisting conditions until a source of funding became available to repair them. Sediment loads would remain at or near present levels.

- ***Cumulative Effects of the Action Alternative to Sediment Delivery***

Cumulative effects to sediment delivery from the Action Alternative would be primarily related to roadwork. Sediment generated from the exposure of bare soil from road use and maintenance would increase the risk of sediment loading in the short term. These increases would not exceed any State water-quality limits. In the long term, the cumulative effects to sediment delivery are expected to be similar to or less than current levels of sediment loading.

There is a low risk of low cumulative effects to sediment delivery from the proposed timber harvest activities. Harvesting of approximately 1.5 acres within the SMZ, RMZ and wetlands adjacent to the Dog Creek SMZ pose a low risk of low impacts to sediment loading due to proximity to live streams. Crossing the adjacent wetland with ground based equipment to access this stand would require a site-specific alternative practice. Overall risk of adverse cumulative effects to sediment loading in the proposed project area and downstream is low. Implementation of BMPs, the SMZ Law, and Forest Management Rules would minimize risk of increased sediment delivery. All activities would comply with applicable laws, rules, and regulations.

Water Yield

- ***Direct and Indirect Effects of the No-Action Alternative to Water Yield***

There would be no direct or indirect effects on water yield. Water quantity would not be changed from present levels and the harvest units would continue to return to fully forested conditions as areas of historic timber harvests regenerate.

- ***Direct and Indirect Effects of the Action Alternative to Water Yield***

There is a low risk of very low direct or indirect effects to water yield from this alternative. Approximately 46 acres of timber would be harvested under this alternative within the proposed project area. The proposed treatment in most of these acres is seed tree harvest, with the remainder proposed for individual tree selection. It is a low risk that this level of harvesting would be sufficient to generate measurable increases in water yield in any streams located within or near the project area or cause channel instability. The stability of channels, where they exist, would be sufficient to handle any anticipated increases without measurable change. As a result, no direct or indirect impacts to water yield are expected in project area drainages as a result of the proposed Action Alternative for the following reasons: 1) the limited extent of the proposal within an 8,561-acre watershed, 2) the moderately well-drained to well-drained nature of most of the soils combined with gentle slopes and low gradients would produce little or no detectable change in water yield or channel form, 3) the streams and ephemeral draws within the project area are stable with well vegetated banks, making them capable of handling potential water yield increases without destabilizing.

- ***Cumulative Effects of the No-Action Alternative on Water Yield***

No cumulative effects on water yield are expected as a result of this project. Existing timber-harvest units would continue to revegetate and move closer to pre-management levels of water use and snowpack distribution.

- ***Cumulative Effects of the Action Alternative on Water Yield***

There is a low risk of very low cumulative effects to water yield in project area drainages and downstream waters as a result of the proposed project for the following reasons: 1) the limited area of the proposal is unlikely to have a measurable effect on Dog Creek or its tributaries, 2) the high stability of stream channels where they exist shows that Dog Creek is not prone to impacts of water yield increases, 3) the moderately well-drained to well-drained nature of most of the soils combined with gentle slopes and low gradients would produce little or no detectable change in water yield or channel form, and 4) the proposed harvesting, combined with past management in Dog Creek would not put the watershed near its threshold of concern for water yield increases.

The proposed project is expected to have a low risk of very low cumulative impacts to water yield as a result of the proposed timber harvesting.

Fish Habitat

- ***Direct and Indirect Effects of the No-Action Alternative to Fish Habitat***

The No-Action Alternative would not affect fish habitat or fish populations in the Dog Creek watershed. Fish habitat and fish populations would continue to be affected by natural and pre-existing conditions, but would not be otherwise affected by this alternative.

- ***Direct and Indirect Effects of the Action Alternative to Fish Habitat***

There is a low risk of low direct and indirect effects to fish habitat from this alternative. The proposal would harvest timber from approximately 46 acres within the project area, with approximately 1.5 of these acres proposed within the Dog Creek RMZ. As reported in the Sediment Delivery portion of this analysis, these activities create a low risk of additional minor sediment delivery to Dog Creek due to operation of ground based equipment within a wetland adjacent to the Dog Creek SMZ. There is also expected to be a low risk of impacts to stream shading/stream temperature or recruitment of large woody debris from this alternative since all RMZ and SMZ rules would be implemented. Risk of adverse direct or indirect effects to fish habitat from this alternative are expected to be minimized by implementation of all applicable SMZ rules, and would satisfy ARM: 36.11.425(5) through 36.11.425(9).

- ***Cumulative Effects of the No-Action Alternative on Fish Habitat***

The cumulative effects of the No-Action Alternative to fish habitat would be similar to those described in the existing conditions. Fish habitat and populations would not be altered by this alternative.

- ***Cumulative Effects of the Action Alternative on Fish Habitat***

There is a low risk of low cumulative effects to fish habitat from the proposed Action Alternative. As reported in the above section, there is a low risk of low direct and indirect impacts from the Action Alternative due to harvesting activities within the Dog Creek RMZ, including sediment delivery, stream temperature and large woody debris recruitment. When these potential impacts are combined with the existing conditions, there is a low risk of adverse cumulative impacts to fish habitat.

Attachment V:
WILDLIFE ANALYSIS

INTRODUCTION

This analysis discloses the existing condition of relevant wildlife resources, and displays the anticipated effects that may result from each alternative of this proposal. There is a general discussion on the analysis areas and analysis methods employed to disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources from the proposed actions. Past and current activities on all ownerships in each analysis area, as well as known planned future agency actions, have been taken into account for the cumulative effects analysis.

Considerations and concerns raised by DNRC specialists and public comments received during initial scoping for the proposed project led to the following list of issues:

- The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.
- The proposed activities could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes.
- The proposed activities could alter grizzly bear (*Ursus arctos*) cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.
- The proposed activities could result in the modification of habitat preferred by Canada lynx (*Felis lynx*) and decrease the area's suitability for lynx.
- The proposed activities could decrease habitat suitability for fishers (*Martes pennanti*) by decreasing canopy cover in mature forest stands, decreasing abundance of snags and coarse woody debris, and by increasing roads, which could elevate risk of trapping mortality.
- The proposed activities could displace gray wolves (*Canis lupus*) from the vicinity of the project area, particularly at denning and rendezvous sites, and/or alter big game prey availability, which could adversely affect gray wolves.
- The proposed activities could negatively affect pileated woodpecker (*Dryocopus pileatus*) habitat suitability by removing canopy cover and snags used for foraging and nesting, and by creating disturbance.
- The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, increasing roads in secure areas, and disturbing animals.

ANALYSIS AREAS

The discussions of existing conditions and environmental effects will focus on two different spatial scales. The first scale will be the "project area," which was used to assess direct and indirect effects to wildlife species and their habitats. The "project area," totaling 275 acres, consists of portions of sections 18, 19, & 20, Township 33 North, Range 23 West. (TABLE W-1 – WILDLIFE ANALYSIS AREAS, FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This project area surrounds the proposed timber harvest units and encompasses the area where potential harvest treatments were considered. Elevation within the project area ranges between 3,480 and 3,760 feet. The proposed project area contains a variety of slope aspects and wildlife habitats.

The second scale is the "cumulative effects analysis area," which refers to the surrounding landscape for assessing cumulative effects to wildlife species and their habitat. Cumulative effects analysis areas (CEAAs) are named according to the relative size of the area and are summarized in TABLE W-1 – WILDLIFE ANALYSIS AREAS and FIGURE W-1 – WILDLIFE ANALYSIS AREAS. CEAAs include the project area as well as lands managed by other agencies and private landowners. Descriptions of each analysis area are located in the **Existing Environment** section for each issue or wildlife species evaluated. In general, CEAAs were delineated to approximate the size of a focal species' home range or to approximate a surrounding landscape in which the proposed activities could most likely have measureable cumulative effects to wildlife habitat. See FIGURE W-1- WILDLIFE ANALYSIS AREAS for a map showing the project and CEAAs.

TABLE W-1. WILDLIFE ANALYSIS AREAS. *Descriptions of the project area and CEAAs.*

ANALYSIS AREA NAME	DESCRIPTION	TOTAL ACRES	ISSUE(S)/SPECIES ANALYZED
Project Area	Portions of sections 18, 19, & 20, Township 33 North, Range 23 West.	275	direct & indirect effects for all issues/species
Small CEEA	DNRC lands east of Highway 93 within the Dog Creek HUC12 watershed.	7,294	mature forests and connectivity, snags and coarse woody debris, pileated woodpecker
Medium CEEA	The Stillwater West lynx management area (LMA).	39,240	Canada lynx, wolves, big game
Large CEEA	The Stryker grizzly bear management unit (BMU) subunit.	40,860	grizzly bears, fishers

In December 2011, DNRC adopted a Habitat Conservation Plan (HCP) in cooperation with the USFWS to minimize potential impacts of the Forest Management Program to grizzly bears, Canada lynx and three species of fish. As a part of the HCP, DNRC agreed to limit road construction and use for 50 years in a transportation plan developed for blocked forestlands

managed by the DNRC Stillwater Unit. This comprehensive access plan is called the Stillwater Block Transportation Plan and includes blocked lands on the Stillwater and Coal Creek state forests. The effects to wildlife associated with the full transportation plan were analyzed in the DNRC HCP EIS (*USFWS and DNRC 2010*). This effects assessment tiers to the detailed analyses contained in those documents. Changes in legal public motorized access within the proposed project area or CEAs used in this document would occur through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (*USFWS and DNRC 2010*).

ANALYSIS METHODS

DNRC attempts to promote biodiversity by taking a coarse-filter approach, which favors a mix of stand structures and compositions on state lands (*ARM 36.11.404*). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a fine-filter approach for threatened, endangered, and sensitive species (*ARM 36.11.406*). The fine-filter approach focuses on habitat requirements of several individual species.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of information and techniques were used. Field visits, scientific literature, DNRC's stand level inventory (SLI) data, aerial photographs, USDA Forest Service Geographical Information System (GIS) data, Montana Natural Heritage Program (MNHP) data, and consultations with other professionals provided information for the following discussion and effects analyses. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area, or the species would not be affected by any alternative.

Cumulative effects analyses account for known past and current activities, as well as planned future agency actions. Ongoing and proposed timber sale projects that could contribute to cumulative effects are summarized in TABLE W-2 - RECENT AND PROPOSED PROJECTS.

TABLE W-2. RECENT AND PROPOSED PROJECTS. Recent and proposed timber harvest projects that could contribute to cumulative effects and the number of harvested acres that occur in each analysis area.

Sale Name	Agency	Status	Project Area	Small CEAA	Medium CEAA	Large CEAA
Dogwing Rebid	DNRC	ongoing	-	142	146	146
Lupfer #3	DNRC	ongoing	-	-	149	-
Olney Urban Interface	DNRC	ongoing	-	60	457	-
Highway 93 Corridor	DNRC	ongoing	-	-	75	-
SE Stryker Ridge	DNRC	ongoing	-	25	25	21
Mystery Fish	DNRC	ongoing	-	442	456	456
Fish Bull Face	DNRC	ongoing	-	-	505	456
Ewing Central	DNRC	ongoing	-	23	346	346
Lower Herrig	DNRC	proposed	-	-	7	7

Changes to vegetation and forest structure resulting from all DNRC projects, with the exception of the proposed DNRC Lower Herrig Timber Sale, have been accounted for in SLI data used for this analysis. The effects of ongoing sales on wildlife will be discussed in cumulative effects analyses.

RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various policy and procedural documents provide the foundation for management criteria pertaining to wildlife and their habitat on state lands. The documents most pertinent to this project include *DNRC Forest Management Rules*, *DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan (HCP)*, the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*.

COARSE FILTER WILDLIFE ANALYSIS

MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY

Issue: *The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.*

Introduction

A variety of wildlife species rely on older, mature forests to meet some or all of their life history requirements. Mature forests, generally characterized by abundant large diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be

strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipiter gentilis*), and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open, non-forested patches that over time develop into young, conifer forests. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Areas

Direct and indirect effects were analyzed on the 275-acre project area. Cumulative effects were analyzed within 7,294 acres comprised of the small CEAA (see TABLE W-1 - WILDLIFE ANALYSIS AREAS and FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale of analysis would be large enough to support a diversity of species that use mature forested habitat and/or require connected forested habitats and centers evaluation of cumulative effects on those areas most likely to be affected by the proposed action.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, DNRC's stand level inventory (SLI) data, aerial-photograph interpretation, USDA Forest Service data (VMap 9.1.1), and GIS analysis. Mature forested habitat was defined as forest stands typically >100 years old with ≥40% canopy cover comprised primarily of trees >9 inches diameter at breast height (dbh). Forested stands containing trees of at least this size and density were considered adequate for providing minimal conditions necessary to facilitate movements of many wildlife species that benefit from well-connected mature forest conditions across the landscape. Road density was calculated in linear miles per square mile by dividing the number of road miles by the specified analysis area in square miles. Factors considered in the analysis include: 1) availability of mature forested habitats (≥40% canopy cover, >9 inches dbh), 2) average patch size, 3) the degree of timber harvesting, 4) open and restricted road density, and 5) the availability of potential travel corridors.

Existing Environment

The project area currently contains approximately 163 acres (59.3% of the project area) of mature western larch/Douglas-fir and mixed conifer stands that have a reasonably well-developed canopy (≥40% crown closure). Crown closure within these mature stands is

generally above 60%. Small patches of densely growing sapling to pole-sized conifers less than 25 feet tall are interspersed within the mature stands. The 163 acres of well-stocked, mature forest stands are well-connected within the proposed project area, with one 160-acre patch and one 3-acre patch (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY). Old-growth forest, as defined by *Green et al. (1992)*, is not present within the proposed project area. Harvesting activities in the mid 1980's have resulted in approximately 66 acres (24.0% of project area) of densely stocked, regenerating forest within the project area. Regenerating conifers within these stands are on average 6 to 20 feet tall. Another 30 acres (10.9% of project area) harvested in the 1990's contain widely spaced mature trees with small regenerating conifers in the understory.

Approximately 3.3 miles (7.6 miles/sq. mile) of DNRC roads exist in the project area (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). Of these miles, approximately 1.0 miles (2.2 miles/sq. mile) are open to public motorized use. All other 2.3 miles of roads (5.3 miles/sq. mile) within the project area are currently restricted to non-motorized use by the general public. All of the road miles within the project area are inaccessible by wheeled motor vehicles during average winter conditions. Due to moderate amounts of mature forest cover and moderate open road densities, habitat connectivity for species using older (100+ years), undisturbed forest is moderate within the project area (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY).

The abundance and spatial arrangement of mature, closed canopy forest within the CEAA has been influenced by past timber harvesting and natural disturbance. Presently, 36.2 percent (2,643 acres) of the CEAA is comprised of relatively well-connected mature forest stands possessing $\geq 40\%$ crown closure. Average patch size of mature forest in the CEAA is 94 acres (28 patches, range 0.4 to 2,255 acres). Landscape connectivity of mature forest stands within the CEAA is moderate to good, with a single 2,255-acre patch providing connectivity throughout most of the CEAA. An additional 18 patches are connected to larger mature forest patches located outside of the CEAA borders. Another 1,579 acres (21.6% of the CEAA) are comprised of 40 to 99 year-old forest stands with overstory crown closures $\geq 40\%$. Approximately 2,968 acres of the CEAA (40.7%) has been harvested within the last 40 years. These stands consist of young, dense regenerating forest with few large scattered trees and do not provide suitable habitat for species that utilize well-stocked, mature forests. Lakes, scree fields, and wetland/riparian meadows comprise 104 acres (1.4%) of the CEAA.

Approximately 48.6 miles (4.3 miles/sq. mile) of DNRC roads exist within the CEAA. Of these roads, there are 24.7 miles of open and seasonally open roads that equate to a density of 2.2 mile/square mile. These roads are primarily a result of past harvesting activities within the CEAA, however they are now used mostly by recreationalists and firewood harvesters. Ongoing harvesting associated with several active timber sales is currently altering forested habitats and landscape connectivity on approximately 692 acres within the CEAA (TABLE W-2 - RECENT AND PROPOSED PROJECTS). Across the CEAA, moderate amounts of mature forest habitat and landscape connectivity are available for species that require and/or prefer these conditions.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitat and Connectivity**

Under this alternative no timber harvesting activities would occur. This would result in: 1) no changes to existing stands; 2) no appreciable changes to forest age, the distribution of forested cover, or landscape connectivity; and 3) no changes to wildlife use. Thus, no direct or indirect effects to mature forested habitat suitability and connectivity would be expected.

- **Direct and Indirect Effects of the Action Alternative on Mature Forested Habitat and Connectivity**

Under the Action Alternative, approximately 46 acres (17.2% of the project area) of well-stocked, mature forest would undergo harvesting (see TABLE W-3 – MATURE FORESTED HABITAT). Of these acres, approximately 38 acres of mature forest would receive harvest treatments that would reduce overstory crown closure from >40% to <5% and increase mature tree spacing to >90 feet. Species that rely on these mature forested habitats would experience a reduction in habitat for 50 to 80 years. An additional 8 acres of mature stands would be harvested through limited sanitation harvest focused on removing select trees with substantive amounts of mistletoe and disease. These 8 acres of stands receiving an intermediate harvest prescription would continue to contain over 40% crown closure and provide habitat for species that utilize smaller areas of mature stands. Under the proposed silvicultural prescriptions, residual trees would be healthy seral species (e.g. western larch, Douglas-fir). Average mature forest patch size would be reduced from 82 acres (2 patches) to 31 acres (4 patches). Two of the four mature forest patches would remain connected to larger patches located outside the project area boundaries. The largest mature forest patch providing connectivity throughout the project area would be reduced from 160 acres to 106 acres (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY). Approximately 125 acres (45.5% of project area) of mature forest in the project area would remain unharvested and could provide suitable habitat for species utilizing smaller patches of mature forest. In particular, unharvested areas adjacent to riparian areas could serve as travel corridors for some species favoring mature forest. After harvesting, the project area would continue to provide a variety of forested habitat conditions for wildlife, but the proportions of these habitats would change. Species preferring larger continuous patches of well-stocked mature forest would likely experience a minor reduction in habitat quality, as 46 acres would be altered and the amount of edge habitat would increase under the proposed harvesting. After harvest completion, the amount of young, regenerating forest stands would increase. However, approximately 66 acres of densely stocked, regenerating forest would continue to develop and will likely provide appreciable amounts of mature forest cover within the next 30 to 50 years. In general, under this alternative, habitat conditions would improve for species adapted to more open forest conditions with seral species, while reducing habitat quality for species that prefer well-stocked, mature forest habitats.

TABLE W-3 – MATURE FORESTED HABITAT. Existing acres, proposed harvest acres, and percentages of mature forested habitat possessing $\geq 40\%$ canopy closure within the project area and cumulative effects analysis area.

Analysis Area	Total Acres	Mature Forested Habitat Present (% area)	Proposed Regeneration Harvest Under Action Alternative (% area)	Mature Forested Habitat Post-Harvest (% area)
Project Area	275	163 (59.3%)	38 (1.7%)	125 (45.5%)
Cumulative Effects Analysis	7,294	2,643 (36.2%)	38 (0.5%)	2,605 (35.7%)

Under the Action Alternative, approximately 1.1 miles of existing restricted road within the project area would be used for harvesting activities. No new roads would be built. During harvest activities, up to 2.1 miles of road (open, seasonally open, and restricted) within the project area could receive use and have elevated traffic levels for up to four years (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). All 23.9 miles of currently restricted road within the project area would remain restricted to public motorized use during harvest activities. Open road density would increase from 2.2 miles/sq. mile to a maximum of 4.9 miles/sq. mile during the proposed activities. At the conclusion of the proposed project, the total amount of roads within the project area would remain the same as pre-project levels (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION).

Minor adverse direct and indirect effects to connectivity and suitability of mature forested habitat in the project area would be expected since: 1) harvesting would appreciably reduce tree density and existing cover on approximately 46 acres (28.8%) of existing available mature stands, however 9 acres would remain mature forest with $\geq 40\%$ crown closure; 2) connectivity of mature forest would be altered, with an increase in the number of patches from 2 to 4 and a decrease in average patch size from 82 to 31 acres and the largest existing patch would be reduced from 160 acres to 115 acres (a 28.1% change); 3) a measure of connectivity would be maintained on 115 acres (41.8% of project area) of mature forest along riparian areas and with mature forest patches adjacent to the project area; and 4) long-term open road density and total road density would not change.

TABLE W-4 – ROAD MANAGEMENT. Miles and density (miles/square mile) of existing road that would be used in the project area under the proposed Action Alternative.

Road Types	Existing Condition Road Miles (mi./sq. mi.)	Open During Proposed Activities Road Miles (mi./sq. mi.)	After Proposed Activities Road Miles (mi./sq. mi.)
Open	0.7 (1.6)	0.7 (1.6)	0.7 (1.6)
Seasonally Open (July 1 – March 31)	0.2 (0.5)	0.2 (0.5)	0.2 (0.5)
Restricted Road	2.4 (5.5)	1.1 (2.6)	2.4 (5.5)
Total Roads	3.4 (7.7)	2.0 ^a (4.6)	3.4 (7.7)

^a Of the 2.0 miles of road that would be functionally open during harvest activities, 1.0 miles would be open for public motorized access.

- Cumulative Effects of the No-Action Alternative on Mature Forested Habitat and Connectivity**

Under this alternative no timber harvesting activities would occur. Thus: 1) no changes to existing stands would occur, 2) no further changes to the suitability of mature forested cover or connectivity would be anticipated, and 3) no changes to wildlife use would be expected. Past and ongoing forest management projects not associated with the proposed Mistle Dog Timber Sale have affected mature forest wildlife habitat in the CEAA, and other proposed projects could affect mature forest habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Activities associated with several ongoing timber sales would continue altering mature forest habitat and create disturbance within a portion of the CEAA. No additional cumulative effects to connectivity and suitability of mature forested habitat are expected to result from the No-Action Alternative that could affect wildlife in the cumulative effects analysis area.

- Cumulative Effects of the Action Alternative on Mature Forested Habitat and Connectivity**

Under the Action Alternative, approximately 46 acres (0.6% of the CEAA) of well-stocked, mature stands would undergo harvest treatments. Proposed harvesting would remove 38 acres (0.5% of the CEAA) of mature forest stands within the CEAA (see TABLE W-3 – MATURE FORESTED HABITAT). This would result in a reduction of 1.4% of the total 2,643 acres of mature forest habitat currently available. An additional eight (8) acres of mature forest would be altered by selective harvesting; however, an ample number of mature trees would be retained to maintain ≥40% overstory crown closure. Reductions in mature forested habitats associated with this alternative would be additive to losses associated with past harvesting activities and any ongoing activities within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). Across the CEAA, 35.7% of mature forested habitat would remain

and landscape connectivity would be altered to a minor degree given the existing condition of the surrounding forested landscape. Existing landscape connectivity would be slightly reduced, as the number of mature forest patches would increase from 28 to 30. Average patch size would decrease from 94 acres to 87 acres. The largest mature patch (2,255 acres) within the CEAA would be reduced to 1,838 acres, but would remain connected to the largest patch within the project area and to mature forest outside of the CEAA. Habitat for species associated with dense, mature stands would be reduced in the CEAA; however, the remaining unharvested stands would be expected to provide adequate habitat for wildlife preferring mature, well-stocked forest. Approximately 1,579 acres (21.6% of the CEAA) of 40 to 99 year-old forest stands would continue to develop and could provide mature forest habitat within the next 20 to 40 years. Wildlife species using young forest stands in the CEAA would benefit from increases of this habitat in the project area for 10 to 30 years post-harvest.

A total of 1.1 miles of restricted and 2.7 miles of open roads would be used within the CEAA to conduct project activities. Proposed harvesting and associated activities could temporarily increase (up to 4 years) open road density within the CEAA from 2.2 miles/sq. mile to 2.3 miles/sq. mile. Temporary increases in open roads associated with this Action Alternative would be additive to increased road use associated with other ongoing activities within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). No new roads would be built and all restricted roads used for proposed harvesting would remain restricted to public motorized use during and after activities. Long-term open road density and total road density would not change under the proposed Action.

Thus, minor adverse cumulative effects to mature forested habitat suitability and connectivity for wildlife would be expected in the cumulative effects analysis area since: 1) harvesting would remove 38 acres (1.4%) of existing mature forest in the CEAA and average patch size would be reduced from 94 acres to 87 acres; 2) current availability of mature, closed canopy habitat would be reduced but connectivity would be altered to a minor degree; 3) mature forest connectivity of the largest patch in the CEAA would be altered by harvest, however mature forest along riparian areas and connectivity with stands adjacent to the CEAA would be maintained; and 4) no new roads would be built and open road density would temporarily (up to 4 years) increase by 0.1 miles/sq. mile within the CEAA.

SNAGS AND COARSE WOODY DEBRIS

Issue: *The proposed activities could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes.*

Introduction

Snags and coarse woody debris are important components of forested ecosystems. The following are five primary functions of snags and downed logs in forest ecosystems: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4)

provide important habitat substrate for wildlife, and 5) act as storehouses for nutrient and organic matter recycling agents (*Parks and Shaw 1996*).

Snags and defective trees (e.g. partially dead, spike top, broken top) are used by a variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (*Hejl and Woods 1991*). The quantity, quality, and distribution of snags affect the presence and abundance of many wildlife species relying upon them. Snags provide foraging sites for insectivorous species and provide structures used by primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) provide habitat for secondary cavity users, including other birds and small to mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Large, tall snags tend to provide nesting sites, while short snags and stumps tend to provide feeding sites (*Bull et al. 1997*). Many species that use small-diameter snags will also use large snags; however, the opposite is not true. Typically, old stands will have greater numbers of large snags. The density of snags is another important indicator of habitat quality for some cavity-nesting species. Species such as the black-backed woodpecker tend to nest and forage in areas where snag densities are high, using one snag for nesting and others nearby for foraging and roosting.

Coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food-storage sites for several wildlife species. Several mammals rely on downed logs and snags for survival and reproduction. The size, length, decay, and distribution of woody debris affect the capacity of various species to meet their life requisites. Single, scattered downed trees can provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles may provide foraging sites for weasels and secure areas for snowshoe hares.

Analysis Areas

Direct and indirect effects were analyzed within the project area (275 acres). Cumulative effects were analyzed within 7,294 acres comprised of the small CEAA (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). Wildlife species associated with snags and coarse woody debris found in the CEAA would be those most likely to be influenced by cumulative effects associated with nearby activities and proposed habitat alteration on the project area.

Analysis Methods

The abundance of snags and coarse woody debris were qualitatively assessed during field visits. Factors considered in the analysis included the level of proposed harvesting, past timber harvest, number of snags, and abundance of coarse woody debris.

Existing Environment

Snags and downed woody debris were relatively abundant due to high amounts of disease and decadence within stands proposed for harvest. Multiple snags $\geq 21''$ dbh were observed within the project area. Snags were generally distributed unevenly; with some areas containing higher

densities than others. Signs of firewood gathering were observed along the 1.0 miles of open road within the project area, which has likely limited snags and large coarse woody debris within 200 feet of the road. Evidence of snag use by wildlife for feeding and/or cavity building was observed in the majority of snags observed. Coarse woody debris levels were also variable across the project area, but generally abundant where greater than 200 feet from open roads. Thus, habitat quality for wildlife utilizing snags and/or coarse woody debris is likely moderate to good within the project area.

Overall, snags exist at current levels to exceed DNRC's minimum-retention thresholds (*ARM 36.11.411*). Large diameter (>21" dbh) snags and snag recruits are present within the project area. Coarse woody debris in the majority of the project area is present in appropriate amounts for the current existing habitat types (*Graham et. al. 1994*).

Similar to unaltered forested landscapes, snags and coarse woody debris are not distributed evenly across the project area or CEAA (*Harris 1999*). Snags and coarse woody debris are frequently collected for firewood near the 24.7 miles of open roads within the CEAA. Abundance and distribution of snags/ coarse woody debris within the CEAA is likely similar to patterns observed within the proposed units, except when near open roads and within recently harvested stands. Within the CEAA, past and ongoing harvesting on 2,938 acres of DNRC lands (40.7% of CEAA), has altered snags, snag recruits, and coarse woody debris levels. On these acres of harvested land within the CEAA, snag and downed wood abundance is likely lower than levels in unharvested areas. Open road density within the CEAA is moderate to high at 2.1 miles/sq. mile (between July 1 – November 1), which facilitates firewood gathering. Overall habitat quality and abundance for wildlife utilizing snags and/or coarse woody debris is likely moderate within the CEAA.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris**

No direct changes in the abundance or distribution of snags and downed logs would be expected. Existing snags would continue to provide wildlife habitat, and new snags and coarse woody debris would be recruited as trees die. No direct or indirect effects to habitat quality for wildlife species requiring snags and coarse woody debris would be expected since: 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) no changes to human access for firewood gathering would occur.

- **Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris**

Under the proposed Action, existing snags, live recruitment trees and coarse woody debris would be altered due to timber harvesting on 46 acres (17.2%) in the proposed project area. Coarse woody debris amounts would likely remain similar to existing levels or decrease slightly within these 46 acres of harvested stands. Proposed harvesting would likely decrease snag abundance and the number of live trees that could be recruited into snags or coarse woody debris. Harvest prescriptions call for retention of 2 snags, and 2 snag recruits per acre greater than 21 inches dbh where they exist, otherwise the next largest size class would be retained.

Additional large-diameter recruitment trees would be left if sufficient large snags are not present. Coarse woody debris would be retained in amounts ranging from 10 to 15 tons/acre, depending upon habitat type within the proposed harvest areas (*Graham et al. 1994*). Although current snags present in the project area are generally moderate in diameter (>12" dbh), ample large live trees >21" dbh suitable for snag recruitment exist within proposed harvest units. Future snag quality in the harvested areas would be enhanced with proposed silvicultural prescriptions. Proposed treatments would be expected to promote increased tree growth, larger tree diameters, and the reestablishment of shade-intolerant species like western larch and western white pine, which provide high-quality structures important for wildlife nesting and foraging. The potential future risk for snag and coarse woody debris loss due to firewood gathering would not be expected to appreciably change if restricted road closures are maintained. Additionally, vegetation providing visual screening would be largely unaltered within 100 feet of open roads; discouraging appreciable loss of snags or coarse woody debris due to firewood gathering. Thus, minor adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect habitat quality of wildlife species requiring these habitat attributes since: 1) harvesting would reduce the density of existing snags and snag recruitment trees on 46 acres (17.2% of project area); 2) coarse woody debris amounts would be retained at similar or slightly reduced levels and would remain within levels recommended by *Graham et. al. (1994)*; 3) levels of snags and coarse woody debris in unharvested areas comprising 42.2% of the project area would remain unaltered; 4) two large snags and two future recruitment trees per acre would be retained in all proposed treatment areas; and 5) no appreciable change in firewood gathering would occur.

- **Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris**

Snags and coarse woody debris would not be altered in the project area under this alternative. Past and ongoing forest management projects not associated with the proposed Mistle Dog Timber Sale have affected snag and coarse woody debris in the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). Harvesting associated with several ongoing timber sales is currently altering snags and coarse woody debris within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). No additional cumulative effects to habitat quality for wildlife species that utilize snags and downed woody debris are expected to result from the No-Action Alternative since: 1) no further harvesting would occur that could affect existing snag and coarse woody debris abundance, and 2) no changes to human access for firewood gathering would occur.

- **Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris**

Wildlife species that rely on snags and coarse woody debris would experience a reduction in habitat quality within 46 acres of harvest units. Coarse woody debris amounts would likely remain similar to existing levels or decrease slightly within 46 acres (0.7% of the CEAA) of harvested stands under the proposed action. Snags and coarse woody debris within the CEAA have received different levels of consideration regarding their management and retention over time. Generally, past harvesting on 2,968 acres (40.7% of the CEAA) has reduced these attributes. The reduction of snags associated with this alternative would be additive to the

losses associated with past harvesting and any ongoing harvesting within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). However, the project requirements to retain 2 large snags and 2 large snag recruits per acre (greater than 21 inches dbh or next largest size class), and 10 to 15 tons of coarse woody debris per acre would assist to mitigate additional cumulative effects associated with this project. Approximately 4,326 acres (59.3%) within the CEAA have not been harvested within the last 40 years and likely contain moderate levels of snags and coarse woody debris. Under the Action Alternative, long-term open road amounts would not change; thus, risk of potential loss of snags and coarse woody debris resulting from firewood gathering would not be expected to appreciably change across the CEAA. Thus, minor adverse cumulative effects to habitat quality for wildlife requiring snags and coarse woody debris would be anticipated over the next 30 to 100 years since: 1) 46 acres (0.7%) of the CEAA would be harvested reducing snags and snag-recruit trees; 2) coarse woody debris levels would not appreciably change or would slightly decrease on 46 acres (0.7% of CEAA); 3) the majority of the CEAA (59.3%) would continue to provide higher amounts of snags and downed wood habitat attributes; 4) long-term motorized public access and associated firewood gathering would not change; and 5) there would be increased representation of shade-intolerant tree species within harvest units that could become high-quality snags in the long term.

FINE-FILTER WILDLIFE ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNR, and animals managed as big game by Montana DFWP. TABLE W-5 – FINE FILTER summarizes how each species considered was included in detailed subsequent analysis or removed from further consideration, since suitable habitat either did not occur within the project area or proposed activities would not affect their required habitat components.

TABLE W-5 – FINE FILTER. Species considered in the fine-filter analysis for the Mistle Dog Timber Sale.

	SPECIES/HABITAT	DETERMINATION – BASIS
Threatened and Endangered Species	Grizzly bear (<i>Ursus arctos</i>) Habitat: Recovery areas, security from human activity	<i>Detailed analysis provided below</i> – The proposed project area occurs in the Stryker Subunit of the Northern Continental Divide Ecosystem (NCDE) Recovery Area (USFWS 1993).
	Canada lynx (<i>Felis lynx</i>) Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	<i>Detailed analysis provided below</i> – Potential lynx habitat types occur within the project area.

Sensitive Species	Bald eagle (<i>Haliaeetus leucocephalus</i>) Habitat: Late-successional forest less than 1 mile from open water	No known nest territories are present in the vicinity of the project area and no large water bodies exist within one mile of the project area that might provide suitable locations for nesting or foraging. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
	Black-backed woodpecker (<i>Picoides arcticus</i>) Habitat: Mature to old burned or beetle-infested forest	No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
	Coeur d'Alene salamander (<i>Plethodon idahoensis</i>) Habitat: Waterfall spray zones, talus near cascading streams	No moist talus or streamside talus habitat would be affected by proposed activities within the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
	Columbian sharp-tailed grouse (<i>Tympanuchus Phasianellus columbianus</i>) Habitat: Grassland, shrubland, riparian, agriculture	No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
	Common loon (<i>Gavia immer</i>) Habitat: Cold mountain lakes, nest in emergent vegetation	No suitable lakes occur within 500 feet of the project area. Thus, no direct, indirect or cumulative effects to common loons would be expected to occur as a result of either alternative.
	Fisher (<i>Martes pennanti</i>) Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian areas	Detailed analysis provided below – Potential fisher habitat occurs within the project area.
	Flammulated owl (<i>Otus flammeolus</i>) Habitat: Late-successional ponderosa pine and Douglas-fir forest	No potentially suitable dry ponderosa pine or Douglas-fir stands exist in the project area. Thus, no direct, indirect or cumulative effects to flammulated owls would be expected to occur as a result of either alternative.
	Gray Wolf (<i>Canis lupus</i>) Habitat: Areas with ample big game populations, security from human activities	Detailed analysis provided below – Wolves have been documented in the vicinity of the proposed project area in the past, and future use of the area by wolves is possible (Kent Laudon, MFWP, pers. comm. January 18, 2013).

	<p>Harlequin duck (<i>Histrionicus histrionicus</i>)</p> <p>Habitat: White-water streams, boulder and cobble substrates</p>	Any potentially suitable streams are over ¼ mile from proposed harvest units and the project area contains no records of harlequin duck sightings in the past (MNHP 2013). The proposed activities would not occur until July 1 or later, after most nesting activity has occurred. Thus, negligible direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
	<p>Northern bog lemming (<i>Synaptomys borealis</i>)</p> <p>Habitat: Sphagnum meadows, bogs, fens with thick moss mats</p>	No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
	<p>Peregrine falcon (<i>Falco peregrinus</i>)</p> <p>Habitat: Cliff features near open foraging areas and/or wetlands</p>	No known cliffs suitable for peregrine falcon nesting exist within the project area. Recent or historical records of peregrine falcons in the vicinity of the project area are lacking (MNHP 2013). Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
	<p>Pileated woodpecker (<i>Dryocopus pileatus</i>)</p> <p>Habitat: Late-successional ponderosa pine and larch-fir forest</p>	<i>Detailed analysis provided below</i> – Potential suitable mature stands exist within the proposed project area.
	<p>Townsend's big-eared bat (<i>Plecotus townsendii</i>)</p> <p>Habitat: Caves, caverns, old mines</p>	No suitable caves or mine tunnels are known to occur in the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats are anticipated as a result of either alternative.
	<p>Wolverine (<i>Gulo gulo</i>)</p> <p>Habitat: Alpine tundra and high-elevation boreal and mountain coniferous forests, areas that maintain deep persistent snow into late spring</p>	No potentially suitable wolverine habitat exists within the proposed project area. The project area does not maintain deep snow into late spring and does not contain high-elevation alpine habitat. While a wolverine could pass through the project area during its extensive movements, appreciable use of the area is not expected. Given the large home range area (average 150+ sq. miles) wolverines occupy, and long distances wolverines typically cover during their movements, the proposed activities would not be expected to measurably affect use of the area by wolverines. Thus, negligible direct, indirect or cumulative effects to wolverines would be expected to occur under the proposed action.

Big Game Species	Elk (<i>Cervus canadensis</i>)	Detailed analysis provided below – The project area does not contain deer winter range habitat, however the entire project area has been identified as elk winter range by DFWP (DFWP, 2008).
	Mule Deer (<i>Odocoileus hemionus</i>)	
	White-tailed Deer (<i>Odocoileus virginianus</i>)	

THREATENED AND ENDANGERED SPECIES

GRIZZLY BEAR

Issue: *The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.*

Introduction

Grizzly bears are generalist omnivores that use a diversity of habitats found in western Montana, and they are currently listed as “threatened” under the Endangered Species Act. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Of these, meadows and riparian areas occur in the project area. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (*Mace and Waller 1997*). Forest-management activities may affect grizzly bears by altering cover, and/or by creating roads, which can increase access for humans in otherwise secure areas (*Mace et. al. 1997*). These actions could lead to the displacement of grizzly bears from preferred areas, and/or result in an increased risk of human-caused mortality. By developing roads and reducing forest cover, forest management activities can bring humans and bears into closer contact, and make bears more detectable, which can increase their risk of being shot illegally. Displacing bears from preferred areas may increase their energetic costs, potentially lowering their ability to survive, and/or reproduce successfully.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 275-acre project area. Cumulative effects were analyzed in a 40,860-acre area (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS) comprised of the Stryker Grizzly Bear BMU Subunit. This CEAA encompasses the project area and approximates the home range size of a female grizzly bear in northwest Montana (*Mace and Roberts 2011*).

Analysis Methods

Field evaluations, aerial photograph interpretation, scientific literature and GIS queries were the basis for this analysis. Grizzly bear hiding cover was considered to be forest vegetation that

will hide 90% of a grizzly bear at a distance of 200 feet. Within the CEAA, open road densities were calculated using the simple linear calculation method (road length in miles divided by area in square miles). Factors considered within this CEAA include availability of timbered stands for hiding cover, level of human disturbance, and miles of open, restricted, and temporary roads.

Existing Environment

All 275 acres of the proposed project area occurs in the NCDE Recovery Area (*USFWS 1993*). Grizzly bears have been observed in the vicinity of the project area in the past and continued appreciable use by bears is anticipated. The proposed project area does not contain Stillwater Block Class A lands that are managed as "quiet areas" requiring special management under the DNRC HCP (*USFWS and DNRC 2010*). Approximately 244 acres (88.8% of project area) of grizzly bear hiding cover is present within the proposed project area. The abundance of vegetative cover likely contributes to security for bears, and facilitates their ability to move freely within the project area. Most stands harvested within the last 35 years within the project area (65 acres, 23.6% of project area) contain dense patches of regenerating conifers that currently break up sight distances and provide hiding cover for grizzly bears. Preferred riparian and wetland areas are present within the project area, as is grizzly bear spring habitat. Managing human access is a major factor in management of grizzly bear habitat. Presently, maximum open road density (occurring July 1 – March 31) in the proposed project area is 1.0 miles/sq. mile and total road density is 7.7 miles/sq. mile. Approximately 0.2 miles of open road is closed to public motorized use from April 1 – June 30, which reduces potential disturbance to grizzly bears during the important spring foraging period. In addition to being blocked by gates or berms, many of the restricted roads within the project area are overgrown with brush and conifers, rendering them impassable to any motorized vehicle use.

The entire 40,860-acre CEAA is within the NCDE Recovery Area (*USFWS 1993*). The CEAA is a relatively intact, mostly undeveloped forested area with a variety of preferred grizzly bear habitats (avalanche chutes, berry fields, riparian areas). Grizzly bear use of the area is well-documented and continued use of the CEAA by bears is likely. Ownership of the CEAA is approximately 81% DNRC, 18% USFS, and 1% private. Forest stands that provide hiding cover persist on over 59.5% of the CEAA (approximately 24,311 acres). Forest habitats across the CEAA are a combination of age classes, ranging from recently harvested stands to mature stands. Approximately 12.8% of the CEAA (5,250 acres) has been harvested within the last 40 years and consists of open, younger stands that do not likely provide hiding cover. Ongoing timber sale projects within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS) are sources of disturbance, increased road use, and are currently altering grizzly bear habitat. Reductions in vegetative cover and increased disturbances, such as those associated with timber harvest, can lower effective use of habitat by bears and render bears more vulnerable to human-caused mortality (*Servoheen et. al. 1999*). Human disturbance levels are closely tied to road abundance and access. Open road density within the CEAA is approximately 1.0 miles/sq. mile and total road density is approximately 2.0 miles/sq. mile (simple linear calculations). Roads present in the CEAA are primarily a result of past timber

management activities, but also include roads used to access USDA Forest Service and privately owned lands. The greatest risk factors for bears within or near the CEAA are likely associated with homes, developments, and railway activities near the western border of the CEAA. Areas where high levels of human recreational use occur are also higher-risk localities for grizzly bears. Unnatural attractants potentially associated with these areas could increase the probability of human-bear conflicts, which can result in bear mortalities.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Grizzly Bears**

None of the proposed forest management activities would occur. No changes to grizzly bear habitat would be expected. Visual screening, existing secure areas, risk of displacement, and open and restricted road density would remain the same. Thus, since: 1) no timber harvesting would alter existing visual screening cover; 2) risk of displacement from important habitat would not increase; 3) no existing secure areas would be affected; and 4) no changes to open or restricted road density would occur, no additional direct or indirect effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the No-Action Alternative.

- **Direct and Indirect Effects of the Action Alternative on Grizzly Bears**

Under the Action Alternative, grizzly bear hiding cover would be appreciably reduced for 15 to 20 years on approximately 38 acres (13.8%) of the project area. Harvesting associated with the Action Alternative would increase sight distances within these 38 acres. Current levels of patchy cover in the form of sub-merchantable trees would be retained where present and feasible in harvest units. An additional 8 acres within harvested units would undergo limited selective timber harvest, which would maintain hiding cover. Existing stands of adjacent dense regenerating conifers, neighboring mature forest patches, and topographic breaks would exist in such a manner that no point in any harvest unit would be greater than 600 feet to screening cover. Existing riparian cover along 2.3 miles of Class 1 and 2 streams would be largely protected and offer movement corridors as well as hiding cover for bears in this preferred habitat. Hiding cover and visual screening adjacent to open roads within the project area would be maintained to the extent practicable, which lessens the risk of mortality by accidental or intentional shooting. Levels of hiding cover would be expected to recover within 15 to 20 years following proposed treatments as shrub and tree regeneration proceeds. Should grizzly bears be present in the area at the time of harvest operations, they could be affected by increased road traffic, noise, and human activity, and by reduced amounts of hiding cover. Proposed activities in grizzly bear habitats would reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditures to endure the disturbance, or causing bears to move away from the area. These potential disturbances would only occur during harvesting operations (1 to 4 years) if they took place during the non-denning period. Continued use of the project area by grizzly bears would be anticipated. Restrictions on motorized use in spring and commercial harvest restrictions would apply to 38 acres of proposed harvest, which would minimize disturbance to bears during the spring period (April 1 – June 15). An additional 8 acres of proposed harvest would be prohibited from April 1 – June

30 in spring habitat associated with HCP Transportation Plan spring road closures. Timber harvest contract requirements would assist in mitigating bear-human conflict risk by specifying that contractors are not permitted to carry firearms on the work site and that unnatural attractants must be stored or disposed of in a bear-resistant manner.

Motorized activities associated with the Action Alternative, such as the use of restricted roads, could affect grizzly bears by temporarily displacing them (1 to 4 years) from previously secure areas. See TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION for road summaries within the project area. No new roads would be built. Approximately 1.1 miles of existing restricted road could be used under the Action Alternative. The use of these existing restricted roads would contribute to open road density in the short term (1 to 4 years); increasing potential for disturbance to grizzly bears. All 1.1 miles of restricted roads that would be used temporarily to carry out proposed project activities would be closed in a manner to prohibit public motorized access during and at completion of harvest activities. Including temporary roads, functionally open road amounts could increase temporarily from 0.7 miles (density 1.0 mi./sq. mi.) up to 2.1 miles (density 4.9 mi./sq. mi.) during project operations for up to 4 years. At the conclusion of the proposed project, long-term open road density and the total amount of roads within the project area would remain the same as pre-project levels (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION).

Thus, minor adverse direct or indirect effects to grizzly bears associated with displacement and mortality risk would be expected since: 1) low to moderate levels of temporary (1 to 4 years) disturbance and displacement would be anticipated; 2) hiding cover on 38 acres (13.8%) would be reduced in the short term, but would be expected to recover in 15-20 years; 3) hiding cover would remain on approximately 206 acres (74.9%) of the project area; 4) reductions in hiding cover would be mitigated through vegetation retention patches within and between harvest units, vegetation retention along riparian corridors and open roads, and reduced sight distances associated with varied topography; 5) commercial harvest and public motorized activities would be restricted during the spring period; 6) no new roads would be built; and 7) short-term increases in functional open road densities from 0.7 mi/sq. mi. to 2.1 miles/sq. mi. would be anticipated, however long-term open road density would not change.

- **Cumulative Effects of the No-Action Alternative on Grizzly Bears**

Under the No-Action Alternative, no proposed project activities would occur. No additional cumulative changes to the level of disturbance to grizzly bears or secure areas would be anticipated. No additional cumulative changes in open-road densities or hiding cover from the existing conditions would be anticipated. Past and ongoing forest management projects not associated with the proposed Mistle Dog Timber Sale have affected grizzly bear habitat in the project area, and other ongoing projects (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) could continue to alter grizzly bear habitat and/or disturb bears in the future. Thus, since no additional changes in available habitats or level of human disturbance would be anticipated as a result of the No-Action Alternative, no cumulative effects to grizzly bear displacement or effects involving mortality risk would be anticipated.

- **Cumulative Effects of the Action Alternative on Grizzly Bears**

Approximately 38 acres (<0.1% of the CEAA) of grizzly bear hiding cover would be harvested within the CEAA. Reductions in hiding cover on 38 acres and anticipated elevated disturbance levels would be additive to past timber harvesting that has affected approximately 5,250 acres (12.8%), as well as current harvest projects (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Harvesting and road building within the last 40 years in the CEAA has altered grizzly bear cover and habitat connectivity, however 30.8% (12,601 acres) of the area would remain in mature forest possessing $\geq 40\%$ canopy cover in the overstory. Additionally, approximately 1,000 acres (2.4% of the CEAA) harvested over 15 years ago are likely providing hiding cover and reduced sight distances. Continued use of the CEAA by grizzly bears would be anticipated. Mature stands and young, fully stocked stands that likely provide hiding cover would make up approximately 24,311 acres (59.5%) of the CEAA. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands across the CEAA.

Collectively, short-term (1 to 4 years) increases in human disturbance would be anticipated in the CEAA, but contract requirements would lessen risk of human-bear conflicts during active harvest operations (e.g. proper storage/disposal of unnatural attractants, prohibit possession of firearms etc.). The increased use of road systems during the proposed project would temporarily increase human disturbance and displacement risk for grizzly bears within a portion of the CEAA. A slight short-term increase in open road density would occur, increasing from 1.01 mi/sq. mi. to 1.02 miles/sq. mile in the CEAA. Density of all permanent roads within the CEAA would not change. Disturbance associated with temporarily accessed roads would be additive to that occurring on roads used for other ongoing forest management projects (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Within the CEAA, high-risk factors for bears associated with human developments would continue to be largely absent. Thus, moderate adverse cumulative effects to grizzly bears associated with displacement or effects involving mortality risk would be expected in the short term (1 to 4 years) and long term (15 to 20 years) since: 1) hiding cover would be removed in the short-term (~15 to 20 years) on a small portion (<0.1%) of the CEAA; 2) approximately 59.4% of the CEAA would continue to provide hiding cover; 3) short-duration (1 to 4 years) increases in human disturbance levels would be expected within the CEAA; 4) short-term increases in functional open road densities from 0.9 mi/sq. mi. to 1.1 miles/sq. mi. would be anticipated and long-term open road density would not change; and 5) the project would likely occur concurrently with at least three additional DNRC timber sales within the CEAA.

CANADA LYNX

Issue: *The proposed activities could result in the modification of habitat preferred by Canada lynx and decrease the area's suitability for lynx.*

Introduction

Canada lynx are listed as “threatened” under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger *et al.* 2000). Lynx abundance and habitat use are strongly associated

with snowshoe hare populations; thus activities which decrease habitat quality for snowshoe hares can reduce the availability of prey for lynx. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares; including well-stocked young and mature coniferous stands (*Squires et al. 2010*). Forest type, tree densities, natural disturbance history, and time since harvesting play important roles in shaping the suitability of young foraging habitat for lynx. Mature subalpine fir stands with abundant horizontal cover and coarse woody debris also provide structure important for foraging, denning, travel, and security. These conditions are found in a variety of habitat types (*Pfister et al. 1977*), particularly within the subalpine fir series. Historically, northwest Montana contained a variety of stand types with differing fire regimes. This variety of stand types combined with patchy elevation and snow-depth gradients preferred by lynx, likely formed a non-continuous mosaic of lynx and non-lynx habitats (*Fischer and Bradley 1987, Ruggiero et. al. 1999, Squires et al. 2010*). Forest management considerations for lynx include providing a mosaic of young and mature lynx habitats that are well connected across the landscape.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 275-acre project area. The cumulative effects analysis area consisted of the Stillwater West Lynx Management Area (39,240 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS), which approximates the home range size of a Canada lynx. Lynx Management Areas (LMAs) are designated portions of DNRC land “where resident lynx populations are known to occur or where there is a high probability of periodic lynx occupancy over time,” (*USFWS and DNRC 2010, Vol. II, p. 2-46*).

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of SLI data and suitable lynx habitats. Suitable lynx habitat was subdivided into the following lynx habitat types: 1) winter foraging, 2) summer foraging, 3) other suitable, and 4) temporary non-habitat. Classification occurred according to DNRC HCP lynx habitat mapping protocols (*DNRC 2010*) based upon a variety of vegetation characteristics important to lynx and snowshoe hares (i.e., forest habitat type, canopy cover, stand age class, stems/acre, and coarse woody debris). Other suitable lynx habitat is defined as habitat that has the potential to provide connectivity and lower quality foraging habitat. The temporary non-habitat category consists of non-forest and open forested stands that are not expected to be used appreciably by lynx until adequate horizontal and vertical cover develops. Factors considered in the analysis include: 1) the abundance of lynx habitat types, 2) landscape connectivity of potential and suitable lynx habitat, and 3) the level of harvesting.

Existing Environment

Approximately 275 acres (100.0%) of potential lynx habitat occurs in the 275 acre project area. Of this potential lynx habitat, 245 acres (88.9%) are currently providing suitable habitat (TABLE W-6– LYNX HABITAT). Suitable lynx habitat within the project area is defined as the sum of the summer foraging, winter foraging, and “other suitable” lynx habitat categories. In the project area, winter foraging habitat is the most abundant type of suitable habitat (TABLE W-6 – LYNX HABITAT). Amounts of coarse woody debris were qualitatively assessed within the

project area and found to be appropriate for the habitat types present (see SNAGS AND COARSE WOODY DEBRIS section of this analysis for further detail). Additionally, riparian areas are present within the proposed project area that provide potential travel corridors for lynx, should they be present in the area. Past harvesting of 96 acres (34.9% of the project area) within the proposed project area has altered lynx habitat, however all but 30 acres have regenerated enough to provide suitable habitat for lynx. The remaining 30 acres of temporary non-suitable habitat will likely be suitable for use by lynx within the next 15 years as conifers regenerate. Throughout the project area, habitat and connectivity conditions are favorable for potential use by lynx.

Canada lynx have been documented within the CEAA in the past (*DNRC unpublished data, and MNHP 2013*). DNRC manages 100% of the CEAA. Habitat types preferred by lynx are abundant within the CEAA (TABLE W-6 – LYNX HABITAT). The distribution of the various lynx habitat elements within the CEAA is the result, primarily, of past natural disturbances, past timber harvesting and the general lack of recent wildfires. The lack of recent fire disturbance in the CEAA (influenced by modern-day fire suppression) has likely led to a smaller proportion of young foraging habitat and a greater proportion of mature foraging habitat or forested travel/other habitats on DNRC lands than was typically present pre-European settlement (*Losensky 1997*). Suitable habitat is well connected within the CEAA, particularly along ridges and in riparian areas. Timber harvesting on 5,250 acres (12.8%) within the CEAA in the last 40 years has altered lynx habitat, however those harvest units logged more than 20 years ago are now providing suitable summer foraging or other suitable habitat.

TABLE W-6 – LYNX HABITAT. Estimates of existing lynx habitat and habitat that would persist post-harvest on DNRC lands in the project area and cumulative effects analysis area. Percent refers to the percent of the lynx habitat category of the total potential habitat^a present on DNRC-managed lands.

LYNX HABITAT CATEGORY	Acres of lynx habitat (percent of DNRC lynx habitat)			
	Project Area		Cumulative Effects Analysis Area	
	Existing	Post-Harvest	Existing	Post-Harvest
OTHER SUITABLE	33.9 (12.3%)	42.9 (15.6%)	4,187.0 (11.8%)	4,196.0 (11.8%)
SUMMER FORAGE	26.4 (9.6%)	26.4 (9.6%)	6,517.5 (18.3%)	6,517.5 (18.3%)
TEMP NONSUITABLE	30.3 (11.0%)	68.3 (24.8%)	4,525.9 (12.7%)	4,563.9 (12.8%)
WINTER FORAGE	184.6 (67.1%)	137.6 (50.0%)	20,330.0 (57.2%)	20,283.0 (57.0%)
Grand Total: Suitable Lynx Habitat	244.9 (88.9%)	206.9 (75.2%)	31,034.6 (87.3%)	30,996.6 (87.2%)

^a Total potential lynx habitat is a habitat category that describes all areas that are providing suitable lynx habitat now, or those likely to provide suitable habitat at some time in the future. Total potential lynx habitat is the sum of the other suitable, summer forage, temp non-suitable, and winter forage habitat categories.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Canada Lynx**

Under this alternative, no changes in lynx habitat elements would be expected in the project area and landscape connectivity would not be altered. Thus, no direct or indirect effects influencing lynx habitat suitability would be expected to occur in the project area.

- **Direct and Indirect Effects of the Action Alternative on Canada Lynx**

Approximately 46 acres (17.2% of project area) of suitable lynx habitat would be subject to harvesting with this alternative. Proposed harvest prescriptions on 38 acres of suitable lynx habitat would decrease mature tree abundance to 4 to 10 mature trees per acre and reduce overstory crown closure to <10%. All acres of suitable lynx habitat inside these harvest units would be converted to temporary non-suitable habitat (TABLE W-6 – LYNX HABITAT) for the next 15 to 20 years. An additional 8 acres of lynx winter foraging habitat would undergo selective harvesting that would maintain greater than 40% overstory crown closure and remain suitable lynx habitat post-harvest. Where operationally feasible and available, existing patches of shade-tolerant sub-merchantable conifers would be retained. The total area of these patches would not be expected to comprise more than 10% of the acres proposed for harvest. Growth of retained mature trees and patches of sapling to pole-sized conifers, combined with post-harvest conifer regeneration following harvest, would lessen the time harvested stands would be temporarily unsuitable for lynx. Activities associated with active logging operations could temporarily displace any lynx using the area for 1-4 years. Following proposed logging, 207 acres (75.2% of project area) of suitable lynx habitat would remain within the project area (TABLE W-6 – LYNX HABITAT). Suitable lynx habitat would be largely retained along streams in the project area and connectivity of suitable habitat would not be appreciably affected. Vegetation retention along important travel features could facilitate lynx movement in the project area, although appreciable use by lynx within harvest unit boundaries would not be expected for 15 to 20 years. In the proposed harvest units, 10 to 15 tons/acre of coarse woody debris would be retained that would provide horizontal cover and security structure for lynx and lynx prey, once harvest units regenerated into suitable habitat in 15 to 20 years. Shade-tolerant tree abundance and coarse woody debris levels would likely be reduced on approximately 38 acres receiving regeneration harvest treatments. Overall, minor adverse direct and indirect effects to habitat suitability for Canada lynx would be expected since: 1) the amount of existing suitable lynx habitat in the project area would be reduced by 13.8% (TABLE W-6 – LYNX HABITAT), 2) suitable lynx habitats would likely develop on 30 acres during the next 10 years within the project area, 3) moderate levels of landscape connectivity would persist along important riparian travel features, and 4) coarse woody debris and small shade-tolerant conifers would be retained to promote forest structural complexity in harvest units, expediting their growth back into suitable lynx habitat.

- **Cumulative Effects of the No-Action Alternative on Canada Lynx**

No appreciable change in lynx habitats would occur under this No-Action Alternative, and no further changes in landscape connectivity would be anticipated. Past forest management

projects not associated with the proposed Mistle Dog Timber Sale have affected lynx habitat in the project area, and ongoing and proposed projects could alter lynx habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Thus, no additional cumulative effects to suitable lynx habitat are expected to result from the No-Action Alternative that could affect lynx habitat suitability in the CEAA.

- **Cumulative Effects of the Action Alternative on Canada Lynx**

Under the Action Alternative, approximately 46 acres (0.7%) of the 39,240-acre CEAA would be altered by harvesting. Of these acres, harvesting would affect 46 acres of currently suitable lynx habitat. Approximately 38 acres would receive regeneration harvest treatments (e.g. seed tree) and 8 acres would be harvested through intermediate treatments. Following proposed harvesting, the CEAA would contain 30,997 acres (87.2%) of suitable lynx habitat (TABLE W-6 – LYNX HABITAT). Expected reductions in suitable lynx habitat and increases in temporary unsuitable habitat in the proposed harvest units would not be expected to appreciably alter lynx use of the CEAA, particularly given that habitat suitability is relatively high in the surrounding landscape. Following treatments, connectivity of suitable lynx habitat would also be maintained along riparian areas and features frequently used by lynx during daily movements (i.e. drainages, ridges etc.) throughout the majority of the CEAA. Suitable lynx habitat within the CEAA is being altered by ongoing DNRC timber sales (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Lynx habitat alteration and increased levels of motorized activities associated with the Action Alternative would be additive to current and proposed timber sales, which could temporarily displace lynx should they be present near the proposed project area and associated roads. Thus, minor adverse cumulative effects to lynx and the suitability of their habitat would be expected as a result of proposed activities since: 1) overall baseline habitat suitability would remain high with 87.2% of the CEAA in suitable habitat; 2) existing suitable lynx habitat within the CEAA would be reduced by 0.1% and those areas would remain unsuitable for at least 15 years; 3) patches of advanced regeneration and shade-tolerant understory trees would be retained where feasible; 4) stands converted to temporary non-suitable habitat in older logging units would continue maturing and developing into suitable habitat within the CEAA; 5) habitat connectivity within the CEAA would be minimally affected by proposed activities; and 6) lynx could be temporarily displaced by logging activities in the CEAA.

SENSITIVE SPECIES

When conducting forest-management activities, the *SFLMP* directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or, could become listed under the *Federal Endangered Species Act* if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful ‘fine filter’ for ensuring that the primary goal of maintaining healthy and diverse forests is met. A search of

the *Montana Natural Heritage Database* was used to locate historical records of sensitive species (as shown in TABLE W-5 – FINE FILTER) in the vicinity of the project area.

FISHER

Issue: *The proposed activities could decrease habitat suitability for fishers by decreasing canopy cover and snag/coarse woody abundance, and by increasing risk of trapping mortality through greater road access.*

Introduction

Fishers are generalist predators that prey upon a variety of small mammals and birds, as well as snowshoe hares and porcupines. They also eat carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of forest successional stages, but are disproportionately found in low to mid elevation mature stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994). They generally avoid openings or young forested stands (Buskirk and Powell 1994). However, some use of openings does occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites, and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest management considerations for fisher involve maintaining large snags, retaining abundant coarse woody debris, providing habitat suitable for resting and denning near riparian areas, and maintaining travel corridors.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 275-acre project area. The proposed project area ranges from 3,480 and 3,760 feet in elevation. Cumulative effects for fisher habitat were analyzed on the Stryker Grizzly Bear BMU Subunit for a CEAA of 40,860 acres (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS).

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of travel corridors, preferred fisher cover types (ARM 36.11.403(60)), and habitat structure. To assess potential fisher habitat and travel cover on DNRC managed lands, sawtimber size class stands (≥ 9 inches dbh average) within preferred fisher cover types below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential habitat suitable for use by fishers (ARM 36.11.403(60)). Fisher habitat was further divided into upland and riparian-associated areas depending upon the proximity to Class 1 and Class 2 streams (ARM 36.11.403(15) and (16)). DNRC manages preferred fisher cover types within 100 feet of Class 1 and 50 feet of Class 2 streams, so that at least 75 percent of the acreage (DNRC lands only) remains in the sawtimber size class in moderate to well-stocked density (ARM 36.11.440(1)(b)(i)). Effects were analyzed using field evaluations, GIS analysis of SLI stand data to estimate potential habitat, and aerial photograph interpretation to evaluate habitat conditions

on non-DNRC lands. Snags and coarse woody debris were assessed using plot data (see SNAG AND COARSE WOODY DEBRIS analysis above), site visits, and by reviewing past DNRC harvesting information. Factors considered in this analysis include the type of harvesting, number of snags, relative amounts of coarse woody debris, the level of firewood harvesting and the risk of trapping mortality.

Existing Environment

The proposed project area contains 160 acres (58.2% of project area) of suitable fisher habitat (TABLE W-7 – FISHER HABITAT). Riparian fisher habitat within the project area is comprised of approximately 43 acres of preferred fisher cover types, of which 41 acres (94.1% of preferred cover types) of riparian habitat are currently suitable for use by fishers. Snags and coarse woody debris (CWD) were qualitatively assessed within proposed harvest units and were generally found to be within levels recommended by *Graham et al. (1994)* for the habitat types present (see SNAGS AND COARSE WOODY DEBRIS). Suitable fisher habitat that provides good habitat connectivity occurs along most of the perennial streams in the project area and is connected to smaller areas of upland habitat. Existing suitable stands are providing the mature forest conditions (≥ 40 crown closure) necessary for use as fisher travel habitat in upland areas. Approximately 96 acres within the project area has been harvested within the last 40 years, likely reducing the amount of suitable upland habitat available to fishers. Open roads facilitate firewood gathering, which can affect the abundance of snags and CWD used by fishers. Additionally, roads near streams can also offer trappers convenient access to forested riparian areas, which increase trapping risk to fishers should they be using the area. There is 1.0 mile of open road within the project area, which offers access for firewood gathering and trapping. This open road permits relatively easy access to portions of Dog Creek (Class 1 stream), which likely increases trapper presence and associated mortality risk for fisher. Overall, fisher habitat suitability and connectivity within the project area is moderate and risk factors are moderate.

Historical records of fisher occurring in the CEAA within the last 50 years are generally lacking, however fishers have been documented in Flathead County (*MNHP 2013, Foresman 2012*) and fishers are likely to use the CEAA. Within the CEAA, there are 10,771 acres (26.4% of the CEAA) of suitable fisher habitat (TABLE W-7 – FISHER HABITAT). Riparian fisher habitat within the CEAA consists of approximately 1,274 acres of preferred fisher cover types on DNRC lands, of which 1,064 acres (83.5% of preferred fisher cover types) are currently suitable for use by fishers. An additional 134 acres of potentially suitable fisher habitat are associated with riparian areas on USFS lands within the CEAA. The majority of Class 1 and 2 streams within the CEAA (below 6,000 feet elevation) have accompanying riparian vegetation that would facilitate fisher travel, and contribute to habitat suitability and connectivity, however suitable upland habitat is somewhat scattered within the CEAA. Within the CEAA, past harvesting has influenced mature crown closure, snags, and coarse woody debris levels on about 5,250 acres (12.8% of the CEAA). The CEAA contains a network of existing open roads (density = 1.0 mi/sq. mile) that facilitate trapper access, although snow on most roads limits motorized vehicle use during typical winter conditions. Collectively, habitat suitability for fishers within the CEAA is moderate and risk factors are moderate.

Environmental Effects

• Direct and Indirect Effects of the No-Action Alternative on Fishers

No change to the stands providing fisher denning and foraging habitats would be expected as no timber harvesting activities would occur under this alternative. Thus, since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be altered; 3) no appreciable changes to canopy cover, snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to human access or potential for trapping mortality would be anticipated, no direct or indirect effects associated with fisher habitat suitability would be expected in the project area.

• Direct and Indirect Effects of the Action Alternative on Fishers

Approximately 42 acres of the 160 acres (24.1%) of suitable fisher habitat in the project area would be harvested under the Action Alternative (TABLE W-7 – FISHER HABITAT). Approximately 29 acres of upland fisher habitat within the project area harvest units would receive harvest treatments that would likely yield stands too sparsely forested for appreciable use by fishers for 40 to 80 years. An additional 8 acres of suitable upland habitat would receive a minor sanitation harvest that would not appreciably alter the suitability of the stand for use by fishers. Up to 0.5 acres of fisher riparian habitat (1.2% of riparian fisher habitat) within 90 to 100 feet of a Class 1 stream could receive a harvest treatment that would leave the harvested area unsuitable for fisher use. No harvesting would occur within 50 feet of Class 1 streams. Limited selective harvest could occur on up to 4.0 acres of riparian fisher habitat, however adequate crown closure ($\geq 40\%$) would be retained to maintain suitable fisher habitat. Approximately 93.0% (40 acres) of preferred fisher cover types in riparian areas would remain suitable for use by fishers. After harvest activities, remaining suitable fisher habitat and habitat connectivity would be primarily associated with riparian areas running through the project area. In all areas, harvest prescriptions call for retention of 2 snags and 2 snag recruits per acre (≥ 21 in. dbh where they exist, otherwise the next largest size class). In addition, 10 to 15 tons of coarse woody debris per acre would be retained within the 42 acres of harvest units proposed for harvesting. While the proposed harvest may reduce density of snags and their recruits in the near future, the sustainability and development of snags in the area would be assisted by retention of appreciable numbers of large, seral snags and snag recruitment trees. These large snags and trees could be a source for fisher denning and resting sites in the future when intensively harvested stands regenerate and develop mature stand characteristics (40 to 80 years). Approximately 21 acres of riparian and upland preferred fisher cover types that currently do not provide ample structural attributes found in suitable fisher habitat would continue maturing and could provide suitable habitat in the next 15 to 40 years. If present in the vicinity of the project area, fishers could be temporarily displaced by forest management activities for up to 4 years. Open road density would increase temporarily under the Action Alternative, however restricted roads used for harvest activities would continue to prohibit public motorized use. Because roads would remain restricted during the trapping season, fisher mortality risk due to trapping would not be expected to change. No appreciable increase in future snag and coarse woody debris loss due to firewood gathering would be anticipated.

Thus, minor adverse direct and indirect effects would be anticipated that would affect fisher habitat suitability in the project area since: 1) existing baseline suitability and connectivity of fisher habitat within the project area is moderate; 2) harvesting would remove 29 acres (24.4%) of suitable upland fisher habitat in the project area; 3) some snags, snag recruits, and coarse woody debris would be retained within harvest units; 4) habitat connectivity would be maintained and riparian fisher habitat would be minimally altered; and 5) overall risk factors associated with public motorized access would not appreciably change.

- **Cumulative Effects of the No-Action Alternative on Fishers**

No additional effects to riparian or upland fisher habitats on DNRC-managed lands would be expected, as no timber harvesting activities would occur under the No-Action Alternative. Thus, no further cumulative effects to fisher habitat suitability would be anticipated in the cumulative effects analysis area since: 1) no changes to existing habitats on DNRC ownership would occur; 2) landscape connectivity afforded by the stands on DNRC ownership would not change; 3) no changes to canopy cover, snags, snag recruits, or coarse woody debris levels would be expected; and 4) no changes to human access or potential for trapping mortality would be anticipated. Ongoing forest management projects not associated with the proposed Mistle Dog Timber Sale have affected fisher habitat in the CEAA and other proposed projects could alter fisher habitat suitability in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS).

- **Cumulative Effects of the Action Alternative on Fishers**

Approximately 42 acres (0.4%) of 10,771 acres of potentially suitable fisher habitat in the CEAA would be harvested. Of these proposed acres, 37 acres would be upland fisher habitat and 5 acres would be riparian habitat. Approximately 29 acres of upland fisher habitat and 0.5 acres of riparian fisher habitat would receive harvest treatments that would make it unsuitable for use by fishers for 40 to 80 years. Of the approximately 1,274 acres of preferred fisher cover types associated with Class 1 and 2 streams on DNRC lands, 1,064 acres (83.5% of preferred fisher cover types) would remain suitable for use by fishers (ARM 36.11.440(1)(b)(i)).

Reductions in upland fisher habitat would be additive to the changes associated with past and current timber harvesting in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Approximately 10,728 acres of the 40,860-acre cumulative effects analysis area (26.3%) would remain as suitable fisher habitat (TABLE W-7 – FISHER HABITAT). Minor reductions in landscape connectivity of suitable upland fisher habitat within the CEAA would occur; however suitable forest stands along riparian areas would persist and appreciable effects on fisher use of the CEAA would not be expected. The potential future risk for snag and coarse woody debris loss due to firewood gathering would not be expected to increase appreciably. Potential trapping mortality would be minimally influenced, as currently restricted roads would remain restricted for public motorized use during and after harvest activities. Thus, minor adverse cumulative effects would be anticipated that would affect fisher habitat suitability within the CEAA since: 1) harvesting would alter tree density and stand structure in 0.4% of suitable fisher habitat within the CEAA; 2) minor changes to fisher habitat associated with riparian areas in the CEAA would be anticipated and 83.5% of the total preferred cover

type acreage would remain moderately to well-stocked; 3) suitable fisher habitat would remain connected within riparian areas; and 4) no appreciable increase in risk of snag/coarse woody debris loss or trapping mortality would be expected.

TABLE W-7– FISHER HABITAT. *Estimates of existing and post-harvest acreages of suitable fisher habitat within the project area and CEAA for the Mistle Dog Timber Sale. Values in parentheses refer to the percentage of the fisher habitat in a category of the total area within the corresponding analysis area.*

Fisher Habitat Category	Project Area (275 acres)		Cumulative Effects Analysis Area (40,860 acres)	
	Existing	Post-Harvest	Existing	Post-Harvest
Suitable Upland Fisher Habitat (DNRC)	118.7 (43.1%)	88.1 (32%)	9,706.9 (23.8%)	9,676.3 (23.7%)
Upland Fisher Habitat (non-DNRC)	N/A	N/A	990.5 (2.4%)	990.5 (2.4%)
Riparian Fisher Habitat (DNRC)	40.8 (14.8%)	40.4 (14.7%)	1,064.3 (2.6%)	1,063.9 (2.6%)
Riparian Fisher Habitat (non-DNRC)	N/A	N/A	134.3 (0.3%)	134.3 (0.3%)
Total Suitable Fisher Habitat (DNRC)	159.5 (58%)	128.5 (46.7%)	10,771.1 (26.4%)	10,740.1 (26.3%)
Total Suitable Fisher Habitat (DNRC lands & non-DNRC lands)	159.5 (58%)	128.5 (46.7%)	11,895.9 (29.1%)	11,864.9 (29%)

GRAY WOLF

Issue: *The proposed activities could displace gray wolves from the vicinity of the project area, particularly at denning and rendezvous sites, and/or alter big game prey availability, which could adversely affect gray wolves.*

Introduction

In April 2011, gray wolves were removed from the federal list of threatened and endangered species in Montana, Idaho and parts of Washington, Oregon, and Utah. DNRC currently considers them as a sensitive species for the purpose of analyzing impacts associated with forest management activities.

Wolves are wide-ranging opportunistic carnivores that prey primarily on white-tailed deer, and, to a lesser extent, elk and moose, in northwest Montana (Kunkel *et al.* 2004). In general, wolf densities are positively correlated to prey densities (Oakleaf *et al.* 2006, Fuller *et al.* 1992). Some studies have shown that wolves may prey upon elk more frequently during certain portions of the year (particularly winter) or in areas where elk numbers are higher (Arjo *et al.* 2002, Kunkel *et al.* 2004, Garrott *et al.* 2006). Thus, reductions in big game numbers and/or winter range productivity could indirectly be unfavorable to wolves.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 275-acre project area. Cumulative effects were analyzed on a 39,240-acre CEAA around the project area (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale approximates an area large enough to support a wolf pack in northwest Montana (based upon DFWP wolf pack home range data, 2010-2011).

Analysis Methods

Direct, indirect, and cumulative effects were analyzed using field evaluations, aerial photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of big game winter range modified and level of human disturbance in relation to any known wolf dens or rendezvous sites.

Existing Conditions

Wolf presence has been documented in the vicinity of the project area in the past, however no denning or rendezvous sites are known or have been recorded in the project area (Kent Laudon, DFWP, personal comm. January 18, 2013). Landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water and in gentle terrain, are present within the project area. The project area does not contain deer winter range, however elk winter range is present (DFWP, 2008). No signs of use by big game or wolves within project area were observed during winter field visits in February 2013. Thus, while current or future presence of wolves in the vicinity of the project area is possible during the non-winter periods, year-round occupancy of the project area is unlikely due to the area's small size and lack of abundant prey.

In northwest Montana, wolves and the habitats they use generally mirror those of their ungulate prey - primarily white-tailed deer, elk, and moose. The proposed project area contains summer habitat for the aforementioned prey species, but only elk and moose winter range is present. Signs of use by deer in the summer months were observed during field visits. The proposed project area contains 1.0 miles of open roads and 2.4 miles of restricted roads that could serve as a source of disturbance and mortality for both wolves and big game (see TABLE W-4– ROAD MANAGEMENT AND CONSTRUCTION).

Within the larger CEAA, winter range for big game prey species is more abundant. Winter range for deer is concentrated at the northern and southern ends of the CEAA. Because winter range for most prey species is largely absent from the middle of the CEAA (where the project area is located), year-round habitat suitability of the CEAA for wolves is moderate. Landscape

features commonly associated with denning and rendezvous sites, including meadows, openings near water, and gentle terrain, occur within the CEAA. Past harvesting on all ownerships in the CEAA has altered mature forest on 8,517 acres (21.7% of CEAA), which could influence use of the area by big game. Current and proposed harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) could potentially alter big game habitat and indirectly influence wolves by potentially changing the distribution of big game. The CEAA contains an extensive network of restricted and open roads (total road density 2.6 miles/sq mile), which has increased human access and the potential for wolf/human interactions. Increasing access to these areas can elevate risk of wolf/human encounters and elevate the vulnerability of their ungulate prey, especially during the hunting season. Big game habitat within CEAA remains largely intact and undeveloped; thus, continued use of the area by wolves and their prey is expected.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Gray Wolves**

No timber harvesting or associated activities would occur under the No-Action Alternative. Thus, since: 1) no additional changes in human disturbance levels would occur; and 2) no changes to the vegetation on big game winter ranges would occur, no direct and indirect effects would be expected to affect gray wolf displacement risk, or big game prey availability that could subsequently affect wolves.

- **Direct and Indirect Effects of the Action Alternative on Gray Wolves**

The proposed activities would affect 46 acres (17.2% of the project area) of elk and moose winter range. However, overall, elk and moose are fairly tolerant of winter conditions due to their large body size and the proposed activities in a limited area are not expected to adversely affect either species. Additional big game winter range does not occur in the project area, but the proposed activities could lead to a shift in big game use of the area and could cause a shift in wolf use of the project area, should they be present. There are no known wolf rendezvous or den sites in the project area. However, if documented in the vicinity of the project area, mechanized activities would be restricted within one (1) mile of wolf dens (ARM 33.11.430(1)(a)) and 0.5 miles of wolf rendezvous sites (ARM 33.11.430(1)(b)). Wolf use of the area is possible, and if present in the vicinity of the project area, wolves could be displaced by forest management activities for up to 4 years. In addition to open roads within the project area, approximately 1.1 miles of restricted road would be used for harvest activities. Public motorized use would remain prohibited on restricted roads for the duration of the proposed project. No new roads would be built and no changes in long-term public motorized access would occur. Thus, minor adverse direct and indirect effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the Action Alternative since: 1) known wolf den or rendezvous sites do not occur in the vicinity of the project area, but restrictions would apply if one or both are encountered during operations (ARM 33.11.430(1)(a)(b)); 2) year-round suitability of the project area for wolves is likely low to moderate; 3) some canopy cover would be removed, but the proposed activities are not

expected to appreciably affect prey availability for wolves; and 4) no changes in long-term open or total road density would occur.

- **Cumulative Effects of the No-Action Alternative on Gray Wolves**

No additional disturbance of gray wolves, their prey, or their habitat would occur under this alternative as no timber harvesting activities would occur. Past and ongoing forest management projects not associated with the proposed Mistle Dog Timber Sale have affected wolf prey availability in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS), and other proposed projects could displace wolves and/or alter wolf prey availability in the future. Therefore, no additional cumulative effects to wolves associated with displacement or prey availability would be expected to result from the No-Action Alternative within the CEAA.

- **Cumulative Effects of the Action Alternative on Gray Wolves**

The proposed harvest would affect 46 acres (0.1% of the CEAA) of 17,440 acres of elk winter range and 36,434 acres of moose winter range within the CEAA. Negligible changes to elk distribution within the CEAA would be expected under the proposed Action. Moose are tolerant of winter conditions and the proposed activities are not expected to adversely affect prey availability for wolves. The proposed activities could lead to a minor shift in big game use of the project area, however an appreciable change in wolf use of the CEAA would not be anticipated. There are no known rendezvous or den sites on DNRC lands in the CEAA. However, if documented in the vicinity of the project areas, mechanized activities would be restricted within one (1) mile of wolf dens (*ARM 33.11.430(1)(a)*) and 0.5 miles of wolf rendezvous sites (*ARM 33.11.430(1)(b)*) while these sites are active. The alteration of canopy cover and disturbance to wolves would be additive to any proposed and ongoing activities occurring in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). If present in the vicinity of the project area, wolves could be displaced by forest management activities associated with the proposed Mistle Dog Timber Sale for up to 4 years. Approximately 1.1 miles of existing restricted road within the project area would be opened for commercial harvest activities for up to 4 years, however public motorized use would remain restricted. No long-term changes in open road density or total road density would occur. Thus, since: 1) known wolf den or rendezvous sites do not occur in the vicinity of the project area, but restrictions would apply if one or both are encountered during operations(*ARM 33.11.430(1)(a)(b)*); 2) an appreciable increase in hunting mortality risk for wolves and prey species would not be anticipated; and 3) some canopy cover would be removed, but the proposed activities are not expected to adversely affect prey availability for wolves; minor adverse cumulative effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the Action Alternative.

PILEATED WOODPECKER

Issue: *The proposed activities could negatively affect pileated woodpecker habitat suitability by removing canopy cover and snags used for foraging and nesting, and by creating disturbance.*

Introduction

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. *Aney and McClelland (1985)* described pileated nesting habitat as...“stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy.” Necessary feeding and nesting habitat attributes include large snags, large decayed trees, and downed wood, which closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively-correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 275-acre project area. The small CEAA, which is comprised of 7,294 total acres of DNRC lands, was used to analyze cumulative effects (see TABLE W-1 – WILDLIFE ANALYSIS AREAS and FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale includes sufficient area to support multiple pairs of pileated woodpeckers if enough suitable habitat is present (*Bull and Jackson 1995*).

Analysis Methods

Analysis methods include field evaluation, aerial photograph interpretation, and GIS analysis of available habitats. SLI data were used to identify preferred pileated woodpecker habitat (*ARM 36.11.403(58)*). Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and mapped potential habitat. For this analysis on DNRC-managed lands in the cumulative effects analysis area, sawtimber stands ≥ 100 years old within preferred pileated cover types (*ARM 36.11.403(58)*) with 40 percent or greater canopy closure were considered potential pileated woodpecker habitat. Cumulative effects were analyzed using field evaluations, GIS analysis of potential habitat, and aerial photograph interpretation of potential habitat on all other lands within the CEAA. Factors considered include the amount of potential pileated woodpecker habitat, degree of harvesting, and the amount of continuous habitat suitable for use by pileated woodpeckers.

Existing Conditions

In the project area, there are approximately 99 acres (36.0% of project area) of potential pileated woodpecker habitat. Current potential pileated habitat within the project area consists of mature Douglas-fir, western larch, and mixed conifer stands in two patches (7 acres, 92 acres). Both patches are part of larger suitable pileated habitat patches located outside of the project area. Large-scale disturbance, primarily in the form of timber harvest, has resulted in young

stands and some cover types not suitable for pileated woodpeckers. Snags and coarse woody debris within the proposed project area are present at levels generally appropriate for the existing habitat types (see SNAGS AND COARSE WOODY DEBRIS) and large snags suitable in size for pileated woodpecker nesting are present. Pileated woodpecker foraging evidence was readily observed during field visits. Past harvesting has altered mature stands, snags, and coarse woody debris on roughly 96 acres (34.9%) of the project area. Firewood gathering, which can result in a reduction of snags and downed logs valuable as woodpecker nesting and foraging substrates, is occurring within the project area primarily adjacent to 1.0 miles of open roads. Given these observed existing habitat conditions, pileated woodpecker habitat suitability is currently moderate within the project area.

The CEAA contains approximately 1,991 acres (27.3% of the CEAA) of potential pileated woodpecker habitat on DNRC-managed lands. Suitable pileated woodpecker habitat within the CEAA is distributed among 35 patches and average patch size is 57 acres (range 0.7 to 459 acres). Pileated woodpecker habitat within the project area is part of a larger 459-acre patch in the CEAA (6.3% of the CEAA). Presently, 1.4 percent (104 acres) of the CEAA is not forested and is not suitable for use by pileated woodpeckers. These non-forested areas include meadows, lakes, roads, and scree. Most of the remaining 5,199 acres (71.3%) within the CEAA consist of young, forested stands or less preferred cover types that are not likely providing suitable habitat for pileated woodpeckers. Firewood gathering is active along 24.7 miles of open roads within the CEAA. Thus, habitat quality and availability for pileated woodpeckers within the CEAA is currently moderate.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers**

No timber harvesting activities would occur under this alternative. Thus, no adverse direct and indirect effects associated with disturbance levels or habitat suitability for pileated woodpeckers in the project area would be expected since: 1) no changes in the amount of continuously forested habitat would be anticipated; 2) no changes to existing pileated woodpecker habitat would be anticipated; and 3) no additional disturbance would take place.

- **Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers**

Under the proposed Action, harvesting in suitable pileated woodpecker habitat within the project area would reduce forested habitat for pileated woodpeckers and create younger-aged stands with widely scattered mature trees. Approximately 38 acres (28.3%) of available pileated woodpecker habitat in the project area would be altered with regeneration-type treatments and would be too open to be suitable habitat following logging. Approximately 71 acres (25.8% of project area) of currently suitable pileated habitat would remain unharvested within the project area. In the stands proposed for regeneration treatments, suitable pileated habitat would be removed for 50 to 80 years. Snags important for nesting pileated woodpeckers would be retained in the proposed harvest areas (see SNAGS AND COARSE WOODY DEBRIS), however the abundance of snags and snag recruitment trees would be reduced. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a

stand (McClelland 1979), pileated woodpecker habitat quality in the project area would be expected to be reduced on 38 acres. Overall patch size of contiguous pileated habitat in the project area would decrease from 49 acres to 35 acres. The largest pileated habitat patch within the project area would be reduced from 92 acres to 64 acres (28), but both existing habitat patches would remain connected to suitable habitat outside of the project area. Silvicultural prescriptions in harvest units would retain healthy western larch and Douglas-fir trees in low densities (6 to 20 per acre), while promoting the regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing high-quality nesting, roosting, and foraging habitat. Low-quality habitat associated shade-tolerant tree species would likely be converted to a more desirable forest type, although it would take about 50 to 80 years to mature into pileated habitat. Pileated woodpeckers tend to be tolerant of human-caused disturbance (Bull and Jackson 1995), but they could be temporarily displaced by the noise and activity associated with the proposed harvesting. No new roads would be built and there would be no long-term changes in the amount of open road within the project area. Thus, minor adverse direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area since: 1) 28.3% of available suitable habitat would be harvested; 2) the amount of contiguous suitable pileated woodpecker habitat would be reduced by 28 acres but both existing patches would remain connected to suitable habitat outside of the project area; 3) some snags and snag recruits would be removed, however, mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre in harvest areas would be included; 4) harvest prescriptions would retain and promote seral tree species in all proposed harvest areas; and 5) temporary levels of potential disturbance would occur over a 1 to 4 year period.

- **Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers**

No timber harvesting activities would occur under this alternative. Past and ongoing forest management projects not associated with the proposed Mistle Dog Timber Sale have affected pileated woodpecker habitat in the project area, and other proposed projects could disturb pileated woodpecker and/or alter habitat suitability in the future (TABLE W-2 – RECENT AND PROPOSED PROJECTS). No additional cumulative effects to pileated woodpeckers associated with disturbance risk or habitat suitability are expected to result from the No-Action Alternative that could affect pileated woodpeckers in the CEAA since: 1) no changes in the amount of continuously forested habitat would be anticipated; 2) no changes to existing pileated woodpecker habitat would be anticipated; and 3) no additional disturbance would take place.

- **Cumulative Effects of the Action Alternative on Pileated Woodpeckers**

Under this alternative, pileated woodpecker habitat would be reduced on 28 acres (1.4%) of the 1,991 acres of existing suitable habitat in the CEAA. Forest canopy on the 28 acres of treated area would be too open for appreciable use by pileated woodpeckers, and would be more similar to other recently harvested stands that comprise 1,401 acres (19.2%) of the CEAA. The number of habitat patches would remain at 35 patches and average patch size would decrease from 57 acres to 56 acres (range 0.3 to 429 acres). Harvesting would reduce the largest existing

459-acre patch in the CEAA (6.3% of the CEAA) to 431 acres (5.9% of the CEAA). Snags, coarse woody debris, and potential nesting trees would be retained in the project area according to forest management ARM 36.11.411 and ARM 36.11.414; however, snags and snag recruitment trees would be reduced from existing levels within the harvest units affecting pileated woodpecker habitat. Recent and ongoing harvesting in the CEAA has altered the quality and abundance of pileated woodpecker habitat; reductions associated with this action alternative would be additive to those reductions (TABLE W-2 – RECENT AND PROPOSED PROJECTS). Overall habitat suitability of the CEAA for pileated woodpeckers would be expected to decrease for 30 to 50 years until harvested stands from the last 20 to 30 years mature. Firewood gathering along open roads would continue to limit the abundance of snags and woody debris within small areas of the CEAA. In the long term, maturation of stands across the CEAA would increase suitable pileated woodpecker habitats through time. Thus, minor cumulative effects to habitat suitability for pileated woodpeckers would be anticipated since: 1) a minor amount (1.4%) of suitable pileated woodpecker habitat present within the CEAA would be altered; 2) existing baseline level of pileated woodpecker habitat suitability is moderate; 3) the number of habitat patches would not increase and average patch size of suitable habitat would be reduced by one acre; 4) some snags and snag recruits per acre would be removed in the proposed harvest areas, however, mitigation measures would retain coarse woody debris and at least 2 large snags and 2 large recruitment trees in harvested areas; and 5) disturbance and firewood gathering would not appreciably change in the long-term given maintained restrictions on access.

BIG GAME HABITAT

Issue: *The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, disturbing animals, and increasing roads in secure areas.*

Introduction

Timber harvesting can affect big game and habitat quality through disturbance during harvest activities, removal of forest crown closure, and by creating openings in the forest used for foraging. Forested habitat on winter ranges increase big game survival by ameliorating the effects of severe winter weather conditions. Winter ranges tend to be areas found at lower elevations that support concentrations of big game, which are widely distributed during the remainder of the year. Suitable winter ranges have adequate midstory and overstory cover that reduces wind velocity and intercepts snow, while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose.

Timber harvesting can increase big game (e.g. elk) vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during times of hunting pressure (Hillis *et al.* 1991). As visibility and accessibility increase within forested landscapes, elk and

deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and resulting decrease in hunter opportunity.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 1,211-acre project area. Cumulative effects were analyzed on a 39,240 acre CEAA (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale of analysis approximates an area capable of supporting an elk herd home range in the fall.

Analysis Methods

To assess big game habitat on the project area, SLI data were used to identify stands with cover types and forest structure (≥ 40 crown closure) that could provide thermal and/or hiding cover for big game species. Cumulative effects were analyzed using field evaluations, GIS analysis of potential habitat, and aerial photograph interpretation of potential habitat on all other lands within the CEAA. Potential thermal and/or hiding cover habitat on non-DNRC lands was considered to be mature forest with $\geq 40\%$ crown closure. Direct, indirect, and cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and a GIS analysis of available habitats. Factors considered in the analysis include the amount of big game winter range habitat available, the extent of past and proposed harvesting, and level of human access for recreational hunting.

Existing Environment

The entire proposed project area (275 acres) has been identified by DFWP as elk and moose winter range. No evidence of winter use by big game species was observed during winter field visits in mid-February 2013. Evidence of summer/fall deer use was observed during field visits to the project area. The project area contains approximately 244 acres (88.8%) of forest vegetation that is currently providing year-round cover and visual screening for big game. Approximately 163 acres (59.3% of the project area) of mature forest are also providing moderate to high amounts of thermal cover and snow intercept for wintering big game. Due to past forest management, 29 acres (10.5%) of the project area have forested stands that contain a more open overstory canopy ($< 40\%$ canopy cover) than what would be considered high-quality thermal cover or cover that would provide appreciable snow intercept. Additionally, 83 acres (30.2% of project area) are comprised of dense conifer regeneration that can supply some additional cover capable of ameliorating the influences of cold and snow. Moderate levels of hunter access exist in the project area, as there are 1.0 miles of open roads and 2.4 miles of restricted roads in the project area. Hunting pressure is limited to non-motorized access opportunities on closed roads. The density of all roads in the project area is 7.6 miles/sq. mile.

Elk and moose winter range occupy approximately 17,440 acres (44.4%) and 36,434 acres (92.9%) of the CEAA, respectively. Elk winter range within the CEAA is connected to a much

larger winter range area (>500,000 acres) extending north through the Tobacco Valley. Presently, approximately 11,475 acres (33.2%) within the CEAA are providing usable thermal cover and snow intercept for big game. In the last 20 years, harvesting has reduced thermal cover and snow intercept on winter range within the CEAA. These recent harvests have reduced the quality and quantity of usable cover on winter range within the area, but they may have increased forage quality and quantity by opening up the forest overstory canopy. However, forage occurring in forest openings is often not available to wintering animals during appreciable portions of the winter due to deep, crusted snow conditions. Encroachment of noxious weeds into recently logged areas has also likely offset some of the potential gain in forage production. Ongoing and future harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) could continue to reduce cover attributes on winter range and temporarily displace big game within the CEAA. The CEAA also likely receives moderate levels of hunter access, especially in areas where roads, both open and restricted, are more numerous. Open road density within the CEAA is 1.3 miles/sq. mile and total road density is 2.6 miles/sq. mile.

Environmental Effects

- **Direct and Indirect Effects of the No-Action Alternative on Big Game Habitat**

No changes in big game habitat would be expected as no timber harvesting activities would occur. Existing cover would continue to contribute to winter range quality, and security habitat would not be altered. Thus, no direct or indirect effects to big game habitat in the project area would be anticipated since: 1) no changes to existing thermal cover would be anticipated and continued maturation of forest cover would improve thermal cover and snow intercept; and 2) the level of human access would remain unchanged.

- **Direct and Indirect Effects of the Action Alternative on Big Game Habitat**

Under the Action Alternative, approximately 46 acres (17.1% of project area) of big game habitat and winter range would be harvested on the project area. Of these acres, roughly 46 acres of mature canopy (≥40%) forest currently providing thermal cover would be harvested. Harvest prescriptions on 38 acres of harvest units would result in areas too open to effectively function as thermal cover or snow intercept. Forest vegetation capable of providing these big game habitat attributes would require 40 to 60 years for suitable-sized trees (>40 ft. tall) to develop in harvested stands. An additional 8 acres of intermediate harvest would retain over 40% overstory crown closure and thus maintain some snow intercept/thermal cover for big game. Continued maturation of 80 acres of previously harvested stands within the project area would improve thermal cover/snow intercept habitat attributes and partially offset losses associated with the Action Alternative within 20 to 40 years.

Proposed tree removal would increase sight distances in harvest units and could increase risk of hunting mortality for 10 to 20 years. Maintaining hiding cover along roads, rolling topography and the retention of scattered patches of regenerating conifers <8 feet tall within harvest units would help mitigate some loss of big game security. Some short-term (1 to 3 years)

displacement of big game could be expected as a result of the proposed motorized logging disturbance. No long-term changes in the amount of open roads or motorized access would occur; however, up to 1.1 miles of existing restricted road would be used for commercial harvest activities within the project area (TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). No new roads would be built under the proposed Action. During all phases of the project, any restricted roads opened with project activities would be restricted from motorized use by the general public and closed after completion of project activities.

Thus, minor adverse direct and indirect effects to big game security habitat and winter range habitat quality would be expected for the next 40 to 60 years since: 1) a minor percentage of available effective thermal cover/snow intercept (28.8%) in the project area would be removed; 2) lesser amounts of unaltered winter range with thermal/cover (125 acres) would remain; 3) sight distances would increase on 38 acres, which could increase big game vulnerability and associated hunting mortality risk; 4) moderate hunter access, rolling topography, and retained patches of regenerating conifers would limit the adverse effects of mature cover removal; 5) relatively short-term logging activities would create disturbance in this area; and 6) there would be no long-term changes in open road density.

- **Cumulative Effects of the No-Action Alternative on Big Game Habitat**

No additional changes in big game habitat would be expected as no timber harvesting activities would occur. Existing levels of cover would persist. Past and ongoing forest management projects not associated with the proposed Mistle Dog 2 Timber Sale (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) have affected big game habitat in the project area, and other proposed projects could disturb big game species and/or alter habitat quality in the future. No additional cumulative effects to big game habitat quality are expected to result from the No-Action Alternative that could affect big game species in the CEAA since: 1) no big game habitat would be altered and continued maturation of forest cover would improve thermal cover and snow intercept; and 2) the level of human access would remain unchanged.

- **Cumulative Effects of the Action Alternative on Big Game Habitat**

Forest stands providing suitable thermal cover and snow intercept would be removed from approximately 38 acres (0.3%) of winter range within the CEAA (39,240 acres). This reduction thermal cover and snow intercept would be additive to past reductions within the CEAA due to forest management. A slight decrease in big game habitat quality on winter range within the CEAA would be expected, only a small portion (<1%) of the larger winter range area falls within the CEAA. No appreciable effects to big game distribution or overall habitat suitability would be expected. Continued maturation of previously harvested stands within the CEAA would improve thermal cover/snow intercept and partially offset these current losses within 20 to 40 years.

Harvesting and motorized disturbance within the CEAA associated with the proposed project could displace wintering big game and reduce available winter range habitats. Displacement and habitat alteration associated with this alternative would be additive to ongoing and recent

timber harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Under the Action Alternative, use of existing restricted roads and new roads constructed for completing harvesting activities could temporarily increase access and disturbance on 3.9 miles and result in a temporary increase in open road density from 1.3 miles/sq. mile to 1.4 miles/sq. mile. After harvesting, open road density would remain at current levels in the CEAA and continue to facilitate moderate amounts of hunter access.

Thus, minor adverse cumulative effects to big game habitat quality and winter range would be expected since: 1) harvesting would reduce overall levels of cover on 46 acres (0.1% of the CEAA) of winter range within the CEAA; 2) existing thermal cover and snow intercept on winter range in the CEAA would be altered, but approximately 11,437 acres of these attributes would remain; 3) potential displacement of big game would occur on < 1% of the CEAA; 4) overall habitat quality within the larger winter range would not be appreciably altered; and 5) long-term open road densities would not change.

FIGURE W-1 – WILDLIFE ANALYSIS AREAS. Areas used to assess effects of the action and no-action alternatives on wildlife and wildlife habitat for the proposed DNRC Mistle Dog Timber Sale.

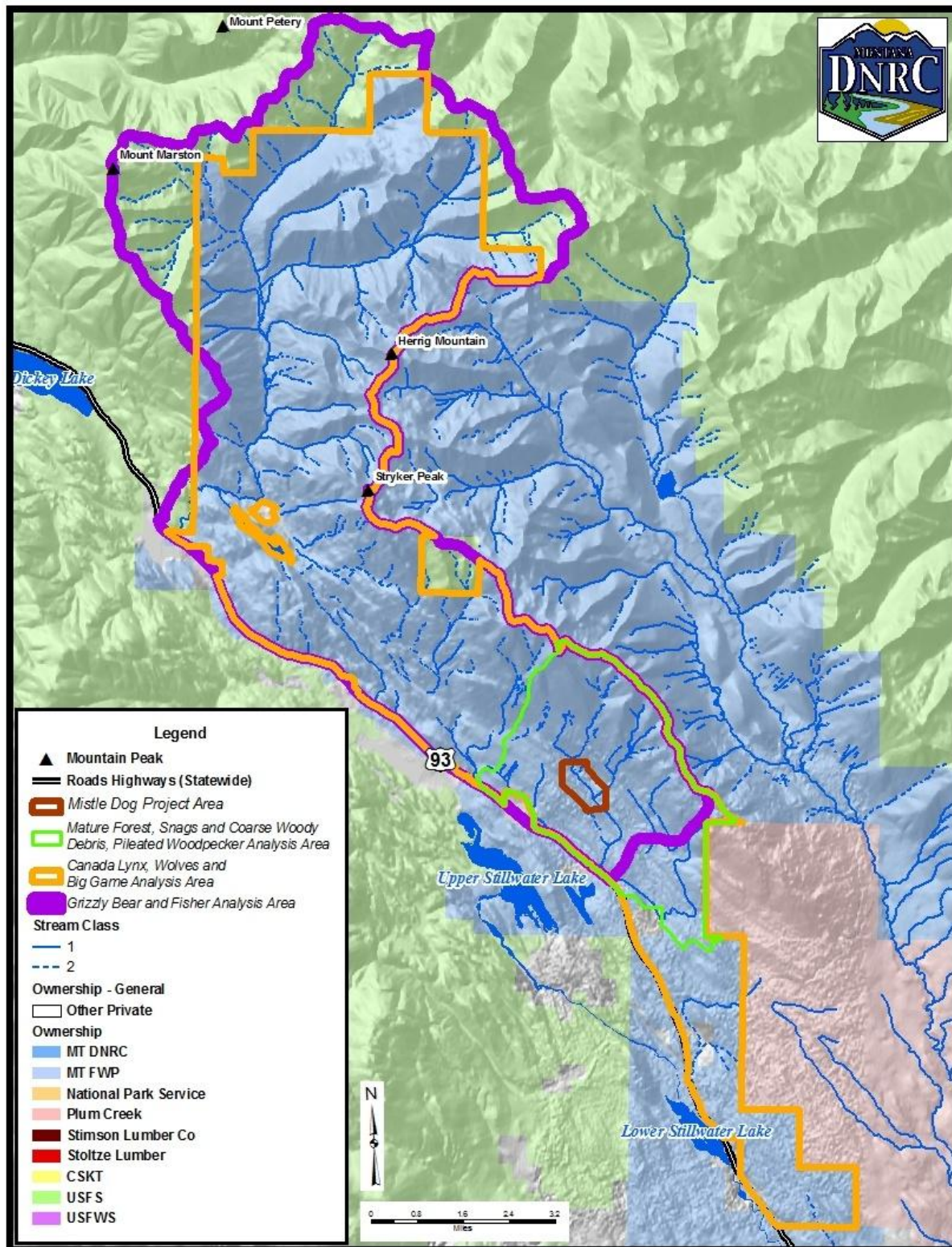
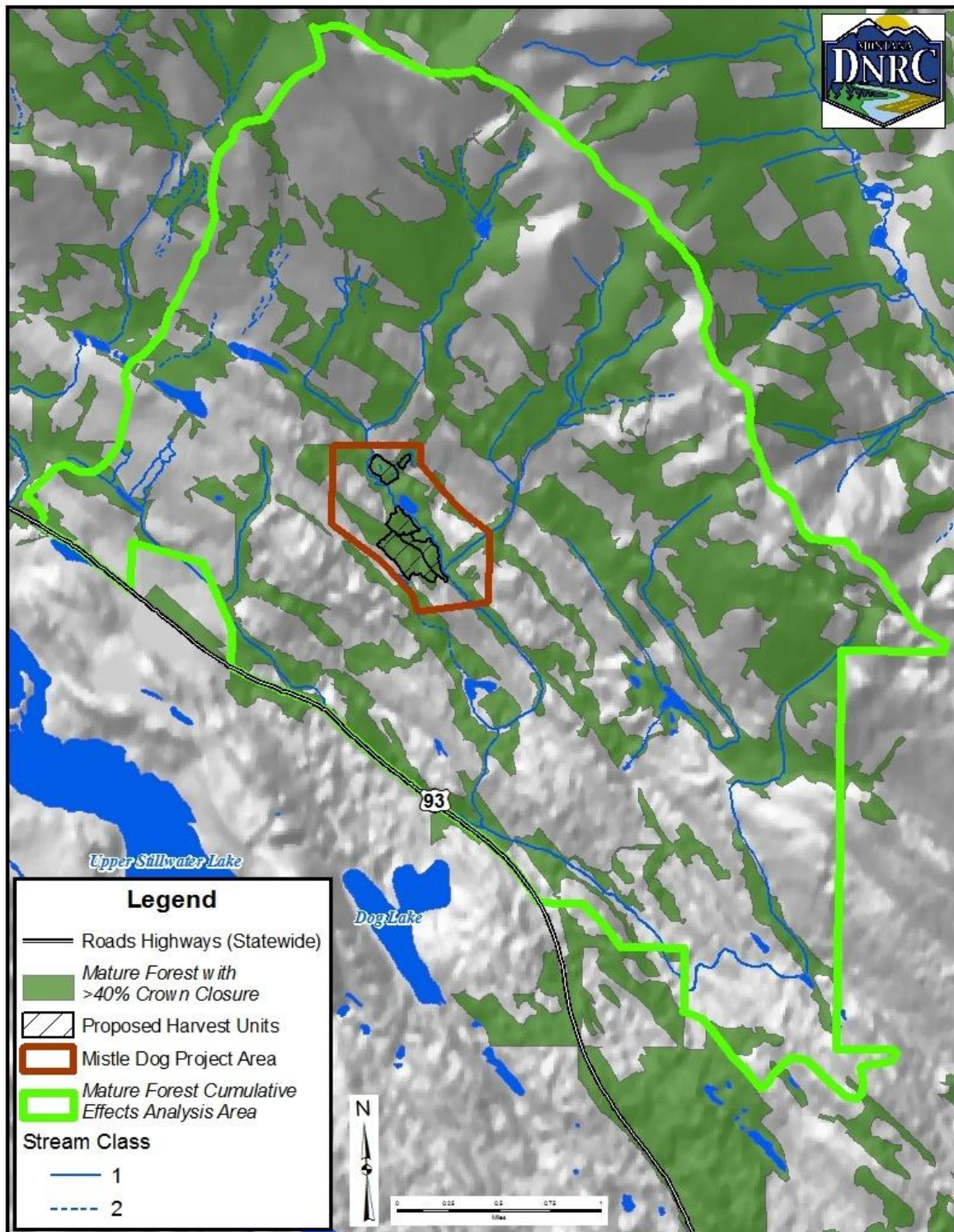


FIGURE W-2 – MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY. Relationship of the project area and proposed units to mature forested stands and potential connectivity for the DNRC Mistle Dog Timber Sale.



Attachment VI: REFERENCES

- Allen, Eric, Morrison, D., Wallis, G. Common Tree Diseases of British Columbia. Online: http://forestry-dev.org/diseases/CTD/index_e.html
- Arjo, W. M., D. H. Pletscher, and R. R. Ream. 2002. Dietary Overlap between Wolves and Coyotes in Northwestern Montana. *Journal of Mammalogy* 83:754-766.
- Binkley, D. and Brown, T. C. 1993. Forest Practices as Nonpoint Sources of Pollution in North America. *JAWRA Journal of the American Water Resources Association*, 29: 729-740.
- Brown, J.K. 1974. Handbook for inventorying downed woody material. In: USDA and Forest Service (Editors). Ogden, Utah: Intermountain Forest and Range Experiment Station.
- Bull, E.L., and J.A. Jackson. 1995. Pileated woodpecker: *Dryocopus pileatus*. In *The Birds of North America*, No. 148 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.
- Bull, E.L., C. G. Parks, and T. R. Torgersen. 1997. Trees and Logs Important to Wildlife in the Interior Columbia River Basin. General Technical report PNW-391. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. 55pp.
- Buskirk, S.W., and R.A. Powell. 1994. Habitat ecology of fishers and American martens. Pages 283-296 in Buskirk, S.W., A. Harestad, M. Raphael, eds. *Biology and conservation of martens, sables and fishers*. Cornell University Press, Ithaca, NY.
- Carlson, Clinton E., and N. William Wulf. 1989. Silvicultural strategies to reduce stand and forest susceptibility to the western spruce budworm. *Agricultural Handbook No. 676*. USDA Forest Service Cooperative State Research Service.
- DFWP. 2008. Maps of moose, elk, mule deer, and white-tailed deer distribution in Montana. Individual GIS data layers. August 12, 2008. Montana Fish, Wildlife and Parks. Helena, MT.
<http://fwp.mt.gov/gisData/imageFiles/distributionElk.jpg>.
<http://fwp.mt.gov/gisData/imageFiles/distributionMoose.jpg>.
<http://fwp.mt.gov/gisData/imageFiles/distributionMuleDeer.jpg>.
<http://fwp.mt.gov/gisData/imageFiles/distributionWhiteTailedDeer.jpg>
- DNRC. 1996. State Forest Land Management Plan Final Environmental Impact Statement. Montana Department of Natural Resources and Conservation, Forest Management Bureau. Missoula, MT.
- DNRC. 2005. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects, 1988-2004. Prepared by J. Collins, Forest Management Bureau, Missoula, MT.
- DNRC. 2005a. Point of Rocks Timber Sale Project Environmental Assessment. Montana DNRC, Olney, MT.
- DNRC. 2007. Duck-to-Dog Timber Sale Project Environmental Assessment. Montana DNRC, Olney, MT.

- DNRC 2010. DNRC Canada lynx habitat mapping protocols for implementation of the HCP. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan Final EIS. September 2010. Vol. II, Appendix B, pp. B-5 to B-19.
- DNRC. 2011. Montana Department of Natural Resources and Conservation Forested State Trust Lands Habitat Conservation Plan, Record of Decision. Montana Department of Natural Resources and Conservation, Missoula, MT. December 2011.
- DNRC. 2011. DNRC update to the Compiled Soils Monitoring Report. Includes data from 1988 through 2011. Unpublished. Prepared by J. Schmalenberg, Forest Management Bureau, Missoula, MT.
- DNRC. 2012. Mystery Fish Timber Sale Project Final Environmental Assessment. Montana DNRC, Olney, MT.
- Fellin, D.G.; Dewey, J.F. Western Spruce Budworm. For. Insect & Disease Leaflet. 53. Washington DC: U.S. Department of Agriculture, Forest Service; 1982.
- Fischer, W.C., and A.F. Bradley. 1987. Fire ecology of western Montana forest habitat types. USDA Forest Service, General Technical Report INT-223. 95pp.
- Flathead County Weed Board. October 2007. Flathead County Weed Management Plan.
- Foresman, K.R.. 2012. Mammals of Montana. Second Edition. Mountain Press Publishing Co., Missoula, MT. 429pp.
- Fuller, T. K., W. E. Berg, G. L. Radde, M. S. Lenarz, and G. B. Joselyn. 1992. A History and Current Estimate of Wolf Distribution and Numbers in Minnesota. Wildlife Society Bulletin 20:42-55.
- Garrott, R., S. Creel, and K. Hamlin. 2006. Monitoring and Assessment of Wolf-Ungulate Interactions and Population Trends within the Greater Yellowstone Area, SW Montana and Montana Statewide. Unpublished report at:
<http://www.homepage.montana.edu/~rgarrott/wolfungulate/index.htm>
- Graham, R.T., A.E. Harvey, M.F. Jurgensen, T.B. Jain, J.R. Tonn, and D. S. Page-Dumroese. 1994. *Managing Coarse Woody Debris in Forest of the Rocky Mountains*. USDA Forest Service Research Paper. INT-RP-447. 13 pp.
- Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old Growth Forest Types of the Northern Region. R-1 SES. USDA Forest Service, Northern Region, Missoula, Montana 60pp.
- Hagle, Susan, Gibson, K., Tunnock, S. 2003. Field Guide to Disease and Insect Pests of Northern and Central Rocky Mountain Conifers. USDA Forest Service. Northern Region. Missoula, Montana.
- Harger, R. 1978. Old-growth forests: managing for wildlife. USDA Forest Service, Northern Region, Missoula, MT. 58pp.
- Harmon, M.E.; J.F. Franklin, and F. J Swanson. 1986. Ecology of coarse woody debris in temperate ecosystems. *Advances in Ecological Research*, Vol. 15. New York: Academic Press: 133-302.

- Harris, R.B. 1999. Abundance and Characteristics of Snags in Western Montana Forests. General Technical report RMRS-GTR-31. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT. 19pp.
- Haupt, H.F., et al., 1974. Forest Hydrology Part II Hydrologic Effects of Vegetation Manipulation. USDA Forest Service, Region 1. Missoula, Montana.
- Hejl, S. J. and R. E. Woods. 1991. Bird assemblages in old-growth and rotation-aged Douglas-fir/ponderosa pine stands in the Northern Rocky Mountains: a preliminary assessment. Pages 93-100 in D. M. Baumgartner and J. E. Lotan, eds. Proc. Symposium: Interior Douglas-fir: the species and its management. Washington State University, Pullman, WA. 306pp.
- Heinemeyer, K. S., and J. L. Jones. 1994. Fisher biology and management in the western United States: A literature review and adaptive management strategy. USDA Forest Service, Northern Region, Missoula, Montana. 108pp.
- Helms, A. John, ed. 1998. The Dictionary of Forestry. Bethesda: The Society of American Foresters.
- Hillis, J.M., and M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.W. McCleerey. 1991. Defining elk security: the Hillis paradigm. Pages 38-43 in A.G. Christensen, L.J. Lyon, and T.N. Lonner, comps., Proc. Elk Vulnerability Symp., Mont. State Univ., Bozeman, Montana. 330pp.
- Jacobs, A.C. and M.R Kuennen. 1998. Stillwater bald eagle nesting territory site-specific guidelines (as of Sept. 30, 1998) Upper Stillwater Lake, Montana. Unpublished report. 71pp.
- Johnson, S. 1984. Home range, movements, and habitat use of fishers in Wisconsin. M.S. Thesis, University Wisconsin, Stevens Point. 78pp.
- Jones, J.L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho. 147pp.
- Koopal, M., Chadwick, A., Sawtelle, C. 2008. Fisheries Resource Summary Report. Unpublished. Prepared for Montana Department of Natural Resources and Conservation, Northwestern Land Office. Kalispell, MT.
- Kunkel, K.E., D.H. Pletscher, D.K. Boyd, R.R. Ream, and M.W. Fairchild. 2004. Factors Correlated with Foraging Behavior of Wolves in and near Glacier National Park, Montana. Journal of Wildlife Management 68(1): 167-178.
- Losensky, B.J. 1997. Historical Vegetation of Montana. Montana Department of Natural Resources and Conservation. Missoula, MT
- Mace, R. and L. Roberts. 2011. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2009-2010. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, MT 59901. Unpublished data.
- Mace, R.D., and J.S. Waller. 1997. Final report: grizzly bear ecology in the Swan Mountains, Montana. Montana Fish, Wildlife and Parks, Helena, MT. 191pp.

- Maloy, O.C. 2001. White Pine Blister Rust. Online: Plant Health Progress doi:10.1094/PHP-2001-0924-01-HM.
- Martinson, A. H. and W. J. Basko. 1998. Soil Survey of Flathead National Forest Area, Montana. USDA Forest Service, Flathead National Forest, Kalispell, Montana.
- McClelland, B.R. 1979. The pileated woodpecker in forests of the Northern Rocky Mountains. Pp. 283-299 *in* Role of insectivorous birds in forest ecosystems. Academic Press.
- McLellan, B.N. and F.W. Hovey. 2001. Habitats selected by grizzly bears in a multiple use landscape. *Journal of Wildlife Management* 65:92-99.
- MDEQ, 2007. Montana Nonpoint Source Management Plan. Montana Department of Environmental Quality, Water Quality Planning Bureau, Watershed Protection Section. Helena, MT. 136 pages.
- MDEQ 2012. Montana DEQ, Planning Prevention and Assistance Division, Water Quality Planning Bureau, Water Quality Standards Section. 2012. DEQ-7 Montana Numeric Water Quality Standards. Helena, MT: Montana Dept. of Environmental Quality.
- MFISH. 2012. Montana Fisheries Information System. Fisheries database managed by Montana Fish, Wildlife and Parks, Information Services Division, Helena, MT. <http://fwp.mt.gov/fishing/mfish/>
- MNHP. 2013. Tracker data. Montana Natural Heritage Program online database query for the Mistle Dog Timber Sale project area. <http://mtnhp.org/Tracker/NHTMap.aspx>
- Oakleaf, J.K., D. L. Murray, J. R. Oakleaf, E. E. Bangs, C. M. Mack, D. W. Smith, J. A. Fontaine, M. D. Jimenez, T. J. Meier, and C. C. Niemeyer. 2006. Habitat Selection by Recolonizing Wolves in the Northern Rocky Mountains of the United States. *Journal of Wildlife Management* 70:554-563.
- Parks, C.G. and D.C. Shaw. 1996. Death and decay: a vital part of living canopies. *Northwest science* 70:46-53.
- Pfister, R., B. Kovalchik, S. Arno, and R. Presby. 1977. Forest habitat types of Montana. USDA For. Serv. Gen. Tech. Rep. INT-34. Intermountain Forest and Range Experiment Station Ogden, Utah. 174pp.
- Powell, R. 1982. The fisher: National history, ecology, and behavior. University of Minnesota Press, Minneapolis, Minnesota. 217pp.
- Raskin, Edward B., Casey J. Clishe, Andrew T. Loch, Johanna M. Bell. 2006. Effectiveness of Timber harvest Practices for Controlling Sediment Related Water Quality Impacts. *Journal of the American Water Resources Association* 42 (5), 1307–1327.
- Rosgen, D. L. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO.
- Roy, K.D. 1991. Ecology of reintroduced fishers in the Cabinet Mountains of Northwestern Montana. MS Thesis, University of Montana, Missoula, 94 pp.
- Ruediger, B., J. Claar, S. Mighton, B. Nanaey, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek. 2000. Canada Lynx Conservation Assessment (2nd Edition). USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT. 122pp.

- Ruggiero, L. F., Aubry, K. B., Buskirk, S. W., Koehler, G. M., Krebs, C. J., McKelvey, K. S., and J. R. Squires. 1999. Ecology and conservation of lynx in the United States. General Technical Report RMRS-GTR-30WW. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Fort Collins, CO. 473 pp.
- Servheen, C. 1983. Grizzly bear food habits, movements, and habitat selection in the Mission Mountains, Montana. *Journal of Wildlife Management* 47(4):1026-1035.
- Servheen, C., S. Herrero, and B. Peyton (compilers). 1999. Bears. Status survey and conservation action plan. IUCN/SSC Bear and Polar Bear Specialist Groups, IUCN, Gland, Switzerland and Cambridge, U.K. 309 pp.
- Servheen, C., J.S. Waller, and P. Sandstrom. 2003. Identification and management of linkage zones for wildlife between the large blocks of public land in the northern Rocky Mountains (revised July 8, 2003). Unpublished report. USFWS, Missoula, Montana.
- Squires, J.R. N.J. Decesare, J.A. Kolbe, and L.F. Ruggiero. 2010. Seasonal resource selection of Canada lynx in managed forests of the Northern Rocky Mountains. *Journal of Wildlife Management*, 74(8):1648-1660.
- USFWS. 1993. Grizzly bear recovery plan. Missoula, Montana. 181pp.
- USFWS and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II. U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.
- Warren, N.M. (ed.) 1990. Old-growth habitats and associated wildlife species in the northern Rocky Mountains. USDA Forest Service, Northern Region, Missoula, MT.
- Wenger, S. 1999. A review of the scientific literature on riparian buffer width, extent, and vegetation. Publication of the Office of Public Service and Outreach, Institute of Ecology, University of Georgia.
- Wicklow, M.C., W. B. Bolen, and W.C. Denison. 1973. Comparison of Soil micro-fungi in 40-year-old stands of pure alder, pure conifer and alder-conifer mixtures. *Soil Biology and Biochemistry*, 6:73-78.

Attachment VII:

GLOSSARY

Administrative road use: Road use that is restricted to DNRC personnel and contractors or for purposes such as monitoring, forest improvement, fire control, hazard reduction, etc.

Airshed: An area defined by a certain set of air conditions; typically, a mountain valley in which air movement is constrained by natural conditions such as topography.

Basal area: A measure of the number of square feet of space occupied by the stem of a tree.

Best Management Practices: A practice or combination of land use management practices that are used to achieve sediment control and protect soil productivity and prevent or reduce non-point pollution to a level compatible with water quality goals. The practices must be technically and economically feasible and socially acceptable.

Biodiversity: The variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

Board foot: A unit for measuring wood volumes. One board foot is a piece of wood 1 foot long, 1 foot wide, and 1 inch thick (144 cubic inches). This measurement is commonly used to express the amount of wood in a tree, saw log, or individual piece of lumber.

Canopy: The upper level of a forest consisting of branches and leaves of the taller trees.

Canopy closure: The percentage of a given area covered by the crowns, or canopies, of trees.

Cavity: A hollow excavated in trees by birds or other animals. Cavities are used for roosting and reproduction by many birds and mammals.

Coarse down woody material: Dead trees within a forest stand that have fallen and begun decomposing on the forest floor; generally larger than 3 inches in diameter.

Coarse-filter: An approach to maintaining biodiversity as described in the State Forest Land Management Plan (DNRC 1996) that involves maintaining a diversity of structures and species composition within stands and a diversity of ecosystems across the landscape.

Co-dominant tree: A tree that extends its crown into the canopy, receiving direct sunlight from above and limited sunlight on its sides. One or more sides are crowded by the crowns of other trees.

Compaction: Increased soil density caused by force exerted at the soil surface, modifying aeration and nutrient availability.

Connectivity: The quality, extent, or state of being joined; unity; the opposite of fragmentation.

Connectivity (fish): The capability of different life stages of HCP fish species to move among the accessible habitats within normally occupied stream segments.

Connectivity (lynx): Stand conditions where sapling, pole or sawtimber stands possess at least 40% crown canopy closure, in a patch greater than 300 feet wide.

Cover: See *Hiding cover* and/or *Thermal cover*.

Covertypes: A classification of timber stands based on the percentage of tree species composition.

Crown cover or crown closure: The percentage of the ground surface covered by vertical projection of tree crowns.

Cull: A tree of such poor quality that it has no merchantable value in terms of the product being cut.

Cutting units: Areas of timber proposed for harvesting.

Cumulative effect: The impact on the environment that results from the incremental impact of the action when added to other

actions. Cumulative impacts can also result from individually minor actions, but collectively they may compound the effect of the actions.

Desired future conditions: The land or resource conditions that will exist if goals and objectives are fully achieved. It is considered synonymous with appropriate conditions.

Direct effect: Effects on the environment that occur at the same time and place as the initial cause or action.

Ditch relief: A method of draining water from roads using ditches and corrugated metal pipe. The pipe is placed just under the surface of the road.

Dominant tree: Those trees within a forest stand that extend their crowns above surrounding trees and capture sunlight from above and around the crown.

Drain dip: A graded depression built into a road to divert water and prevent soil erosion.

Ecosystem: An interacting system of living organisms and the land and water that make up their environment; the home place of all living things, including humans.

Edge: The border between two or more habitats such as a wetland and mature forest.

Equivalent clearcut acres (ECA): This method equates the area harvested and the percent of crown removed with an equivalent amount of clearcut area.

- ☐ *Allowable ECA* - The estimated number of acres that can be clearcut before stream channel stability is affected.
- ☐ *Existing ECA* - The number of acres that have been previously harvested, taking into account the degree of hydrologic recovery that has occurred due to revegetation.
- ☐ *Remaining ECA* - The calculated amount of harvesting that may occur without substantially increasing the risk of causing detrimental effects to the stability of the stream channel.

Excavator piling: The piling of logging residue using an excavator.

Fire regimes: Describes the frequency, type,

and severity of wildfires. Examples include: frequent nonlethal underburns; mixed-severity fires; and stand-replacement or lethal burns.

Forage: All browse and nonwoody plants available and acceptable to grazing animals or that may be harvested for feeding purposes.

Forest improvement: The establishment and growing of trees after a site has been harvested. Associated activities include:

- site preparation,
- planting,
- survival checks,
- regeneration surveys, and
- stand thinnings.

Fragmentation (forest): A reduction of connectivity and an increase in sharp stand edges resulting when large contiguous areas of forest with similar age and structural character are interrupted through disturbance (stand-replacement fire, timber harvesting, etc.).

Habitat: The place where a plant or animal naturally or normally lives and grows.

Habitat type: Forest vegetation types that follow the habitat type climax vegetation classification system developed by Pfister et al. (1977).

Hazard reduction: The reduction of fire hazard by processing logging residue with methods such as separation, removal, scattering, lopping, crushing, piling and burning, broadcast burning, burying, and chipping.

Hiding cover: Vegetation capable of hiding some specified portion of a standing adult mammal from human view, at a distance of 200 feet.

Historical forest condition: The condition of the forest prior to settlement by Europeans.

Homogeneous: Of uniform structure or composition throughout.

Indirect Effects: Secondary effects that occur in locations other than the initial action or significantly later in time.

Interdisciplinary team (ID Team):
A team of resource specialists brought together to analyze the effects of a

project on the environment.

Intermediate trees: A characteristic of certain tree species that allows them to survive in relatively low light conditions, although they may not thrive.

Landscape: An area of land with interacting ecosystems.

Live Crown Ratio: The percentage of the length of tree having live limbs divided by the tree's height.

Meter: A measurement equaling 39.37 inches.

Mitigation measure: An action or policy designed to reduce or prevent detrimental effects.

Multistoried stands: Timber stands with 3 or more distinct stories.

Nest-site area (bald eagle): The area in which human activity or development may stimulate abandonment of the breeding area, affect successful completion of the nesting cycle, or reduce productivity. This area is either mapped for a specific nest based on field data, or, if that is impossible, is defined as the area within a quarter-mile radius of all nest sites in the breeding area that have been active within 5 years.

No-action alternative: The option of maintaining the status quo and continuing present management activities; the proposed project would not be implemented.

Nonforested area: A naturally occurring area where trees do not establish over the long term, such as bogs, natural meadows, avalanche chutes, and alpine areas.

Old growth: For this analysis, old growth is defined as stands that meet the minimum criteria (number of trees per acre that have a minimum dbh and a minimum age) for a given site (old-growth group from habitat type). These minimums can be found in the *Green et al Old Growth Forest Types of the Northern Region* (see *REFERENCES*).

Open-Road Densities: Percent of the grizzly bear subunit exceeding a density of 1 mile per square mile of open roads.

Overstory: The level of the forest canopy including the crowns of dominant, codominant, and intermediate trees.

Patch: A discrete area of forest connected to other discrete forest areas by relatively narrow corridors; an ecosystem element (such as vegetation) that is relatively homogeneous internally, but differs from what surrounds it.

Phloem: The living tissue of the tree.

Project file: A public record of the analysis process, including all documents that form the basis for the project analysis. The project file for the Mystery Fish Timber Sale is located at the Stillwater State Forest office near Olney, Montana.

Redds: The spawning ground or nest of various fish species.

Regeneration: The replacement of one forest stand by another as a result of natural seeding, sprouting, planting, or other methods.

Restricted road: A road that is managed to limit the manner in which motorized vehicles may be used. Restricted roads have a physical barrier that restricts the general use of motorized vehicles. Restrictions may be man-made or naturally occurring.

Residual stand: Trees that remain standing following any harvesting operation.

Road: Any created or evolved access route that is greater than 500 feet long and is reasonably and prudently drivable with a conventional two-wheel-drive passenger car or two-wheel-drive pickup.

Road-construction activities: In general, the term 'road construction activities' refers to all the activities conducted while building new roads, reconstructing existing roads, and obliterating roads. The activities may include any or all of the following:

- road construction;
- right-of-way clearing;
- excavation of cut/fill material;
- installation of road surface and ditch drainage features;
- installation of culverts at stream crossings;

- burning right-of-way slash;
- hauling and installation of borrow material; and
- blading and shaping road surfaces.

Road improvements: Construction projects on an existing road to improve ease of travel, safety, drainage, and water quality.

Saplings: Trees 1 to 4 inches in diameter at breast height.

Sawtimber trees: Trees with a minimum dbh of 9 inches.

Scarification: The mechanized gouging and ripping of surface vegetation and litter to expose mineral soil and enhance the establishment of natural regeneration.

Scoping: The process of determining the extent of the environmental assessment task. Scoping includes public involvement to learn which issues and concerns should be addressed and the depth of assessment that will be required. It also includes a review of other factors, such as laws, policies, actions by other landowners, and jurisdictions of other agencies that may affect the extent of assessment needed.

Security: For wild animals, the freedom from the likelihood of displacement or mortality due to human disturbance or confrontation.

Seedlings: Live trees less than 1 inch dbh.

Sediment: In bodies of water, solid material, mineral or organic, that is suspended and transported or deposited.

Sediment yield: The amount of sediment that is carried to streams.

Seral: Refers to a biotic community that is in a developmental, transitional stage in ecological succession.

Shade intolerant: Describes the tree species that generally can only reproduce and grow in the open or where the overstory is broken and allows sufficient sunlight to penetrate. Often these are seral species that get replaced by more shade-tolerant species during succession. In Stillwater State Forest, shade-intolerant species generally include ponderosa pine, western larch, Douglas-fir, western white pine, and lodgepole pine.

Shade tolerant: Describes tree species that can reproduce and grow under the canopy in poor sunlight conditions. These species replace less shade-tolerant species during succession. In Stillwater State Forest, shade-tolerant species generally include subalpine fir, grand fir, Engelmann spruce, and western red cedar.

Sight distance: The distance at which 90% of an animal is hidden from view. On forested trust lands, this is approximately 100 feet, but may be more or less depending on specific vegetative and topographic conditions.

Siltation: The process of very fine particles of soil (silt) settling. This may occur in streams or from runoff. An example would be the silt build-up left after a puddle evaporates.

Silviculture: The art and science of managing the establishment, composition, and growth of forests to accomplish specific objectives.

Site preparation: A hand or mechanized manipulation of a harvested site to enhance the success of regeneration. Treatments are intended to modify the soil, litter, and vegetation to create microclimate conditions conducive to the establishment and growth of desired species.

Slash: Branches, tree tops, and cull trees left on the ground following a harvest.

Snag: A standing dead tree or the portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife.

Snow intercept: The action of trees and other plants in catching falling snow and preventing it from reaching the ground.

Spur roads: Low-standard roads constructed to meet minimum requirements for harvest-related traffic.

Stand: An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition so as to be distinguishable from the adjoining forest.

Stand density: Number of trees per acre.

Stocking: The degree of occupancy of land by trees as measured by basal area or number of trees, and as compared to a stocking standard (which is an estimate of either the basal area) or

the number of trees per acre required to fully use the growth potential of the land.

Stream gradient: The slope of a stream along its course, usually expressed in percentage indicating the amount of drop per 100 feet.

Stumpage: The value of standing trees in the forest; sometimes used to mean the commercial value of standing trees.

Succession: The natural series of replacement of one plant (and animal) community by another over time in the absence of disturbance.

Suppressed: The condition of a tree characterized by a low growth rate and low vigor due to competition.

Temporary road: Roads built to the minimal standards necessary to prevent impacts to water quality and provide a safe and efficient route to remove logs from the timber sale area. Following logging operations or site preparations, the road would no longer function as an open road, restricted road or trail. DNRC would assure that they no longer could be accessed for commercial, administrative or public motorized use.

- Segments near the beginning of the new temporary road systems would be reshaped to their natural contours and reclaimed for approximately 200 feet by grass seeding and strewing slash and debris.

- The reclamation of the remaining road would include a combination of ripping or mechanically loosening the surface soils on the road, removing culverts or bridges that were installed, spreading forest debris along portions of the road, and allowing the surface to revegetate naturally.

Texture: A term used in visual assessments indicating distinctive or identifying features of the landscape depending on distance.

Thermal cover: For white-tailed deer, thermal cover has 70 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

For elk and mule deer, thermal cover has 50 percent or more coniferous canopy closure at least 20 feet above the ground, generally

requiring trees to be 40 feet or taller.

Timber-harvesting activities: In general, the term timber-harvesting activities refers to all the activities conducted to facilitate timber removal before, during, and after the timber is removed. These activities may include any or all of the following:

- felling and bucking standing trees into logs;
- skidding logs to a landing;
- processing, sorting, and loading logs onto trucks at the landing;
- hauling logs by truck to a mill;
- slashing and sanitizing residual vegetation damaged during logging;
- machine piling logging slash;
- burning logging slash;
- scarifying and preparing the site for planting; and
- planting trees.

Total Road Densities: Percent of grizzly bear subunit with more than 2 miles per square mile of total road.

Understory: The trees and other woody species growing under a, more or less, continuous cover of branches and foliage formed collectively by the overstory of adjacent trees and other woody growth.

Uneven-aged stand: Various ages and sizes of trees growing together on a uniform site.

Ungulates: Hoofed animals, such as mule deer, white-tailed deer, elk, and moose, that are mostly herbivorous; many are horned or antlered.

Vigor: The degree of health and growth of a tree or stand of trees.

Visual screening: Vegetation and/or topography providing visual obstruction capable of hiding a grizzly bear from view. The distance or patch size and configuration required to provide effective visual screening depends on the topography and/or type and density of cover available.

Watershed: The region or area drained by a river or other body of water.

Water yield: The average annual runoff for a particular watershed expressed in acre-feet.

Water-yield increase: Due to forest canopy removal, an increase in the average annual runoff over natural conditions.

Windthrow: A tree pushed over by wind. Windthrows (blowdowns) are common among shallow-rooted species and in areas where cutting or natural disturbances have reduced the density of a stand so individual trees remain unprotected from the force of the wind.

Attachment VIII:
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Acronyms

ARM.....	<i>Administrative Rules of Montana</i>	MCA.....	<i>Montana Codes Annotated</i>
BMP.....	<i>Best Management Practices</i>	MEPA.....	<i>Montana Environmental Policy Act</i>
BMU.....	<i>Bear Management Unit</i>	Mbf.....	<i>Thousand Board Feet</i>
CEAA.....	<i>Cumulative Effects Analysis Area</i>	MMbf.....	<i>Million Board Feet</i>
cmp.....	<i>corrugated metal pipe</i>	MNHP.....	<i>Montana Natural Heritage Program</i>
CWD.....	<i>Coarse Woody Debris</i>	NCDE.....	<i>Northern Continental Divide Ecosystem</i>
dbh.....	<i>diameter at breast height</i>	NWLO.....	<i>Northwestern Land Office</i>
DEQ.....	<i>Department of Environmental Quality</i>	RL.....	<i>Random Lengths</i>
DFWP.....	<i>Montana Department of Fish, Wildlife, and Parks</i>	RMZ.....	<i>Riparian Management Zone</i>
DNRC.....	<i>Department of Natural Resources and Conservation</i>	SFLMP.....	<i>State Forest Land Management Plan</i>
EA.....	<i>Environmental Assessment</i>	SLI.....	<i>Stand Level Inventory</i>
ECA.....	<i>Equivalent Clearcut Acres</i>	SMZ.....	<i>Streamside Management Zone</i>
EIS.....	<i>Environmental Impact Statement</i>	STW.....	<i>Stillwater Unit</i>
ERZ.....	<i>Equipment Restriction Zone</i>	TLMD.....	<i>Trust Land Management Division</i>
FIA.....	<i>Forest Inventory and Analysis group</i>	TMDL.....	<i>Total Maximum Daily Load</i>
FI.....	<i>Forest Improvement</i>	USFS.....	<i>United States Forest Service</i>
FNF.....	<i>Flathead National Forest</i>	USFWS.....	<i>United States Fish and Wildlife Service</i>
FRTA.....	<i>Federal Roads and Trails Act</i>	WFP.....	<i>Washington Forest Practices Board</i>
FOGI.....	<i>Full Old-Growth Index</i>	WMZ.....	<i>Wetland Management Zone</i>
GBS.....	<i>Grizzly Bear Subunit</i>	WYI.....	<i>Water Yield Increases</i>
GIS.....	<i>Geographic Information System</i>	124 Permit...	<i>Stream Protection Act Permit</i>
HCP.....	<i>Habitat Conservation Plan</i>	318 Authorization	<i>A Short-Term Exemption from Montana's Surface Water Quality and Standards</i>
ID Team....	<i>Interdisciplinary Team</i>		

MISTLE DOG TIMBER SALE CHECKLIST ENVIRONMENTAL ASSESSMENT

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